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ERYTHEMA MULTIFORME EXUDATIVUM WITH MUCOUS MEMBRANE INVOLVEMENT: WITH A REPORT OF THREE CASES.

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FROM among the polymorphous erythemata, Hebra (1866) described an entity which he called *erythema multiforme exudativum*. In his account of the disease he did not mention lesions of the mucous membranes. Later authors amplified his description and drew attention to the possible involvement of the mucous membranes, particularly those of the eyes and mouth. It is now apparent that *erythema multiforme exudativum* is a disease of the skin and of the mucous membranes. Bailey (1931), Keil (1940) and Thomas (1950) have reviewed the history of the disease.

Though usually a mild, self-limited condition, *erythema multiforme exudativum* is potentially a very serious and even fatal disease when the mucous membranes are involved to any great extent. Failure to realize this led some authors, who in some cases thought they were describing a new disease, to report cases of *erythema multiforme exudativum* with serious mucous membrane involvement under a variety of different names, such as *ectodermosis erosiva pluriorificialis* (Rendu, 1916), "a new eruptive fever with stomatitis and ophthalmia" (Stevens and Johnson, 1922), dermatostomatitis (Baader, 1925), acute ulcerative stomatitis (Walton, Graham and Lansdown, 1941), ulcero-membranous stomatitis (Henry, 1942), Stevens-Johnson syndrome (Kove, 1945, and many others); Stevens-Johnson disease (Murphy, 1944; Jones, Talbot and King, 1946), and the mucosal respiratory syndrome (Stanyon and Warner, 1945).

There is still a small but rapidly dwindling body of opinion today that would hold that these cases of *erythema multiforme exudativum* with serious mucous membrane involvement form a different disease entity from the *erythema multiforme exudativum* of Hebra (Stanyon and Warner, 1945; Sneddon, 1947). Two facts would seem to make such a view unlikely. Firstly, some of the seriously affected patients (Thomas, 1950; Friedmann and Pathé, 1953), and even the rare patient who dies (Finland, Jolliffe and Parker, 1948), have had previous minor attacks in which the skin rash or the stomatitis has often been the only manifestation of the disease. Secondly, there is a large group of cases which form a connecting link between the graver and the milder forms of the disease. These cases, which present varying degrees and combinations of two or more of the following—rash, conjunctivitis, stomatitis, balanitis and pneumonia—are sometimes reported (Soll, 1947), but probably most frequently go unreported, although some observers have commented on their frequency (Keil, 1940; Fletcher and Harris, 1945; Finland, Jolliffe and Parker, 1948).

The majority of authors accept the unitary nature of the disease *erythema multiforme exudativum* (Bailey, 1931; Klauder, 1937; Keil, 1940; Koke, 1941; Lever, 1944; Fletcher and Harris, 1945; Commission on Acute Respiratory Diseases, 1946; Finland *et alii*, 1948; Ustvedt, 1948; Thomas, 1950; Ashby and Lazar, 1951; Robinson, 1951; Billow and Lowen, 1952).

Some Features of the Disease with Mucous Membrane Involvement.

Involvement of the mucous membranes occurs in at least 25% of cases of *erythema multiforme exudativum* (Keil, 1940). Ustvedt (1948), in his review of 219 cases of the disease, found one or more mucous membranes involved in 45%, and this was regarded as a minimum figure. These figures exclude those patients with involvement of mucous membranes and no rash.

The condition has its maximum incidence in the young adult. Age limits are from four weeks (Landott, 1946) to eighty-five years (Fishman, 1951). Males are affected slightly more frequently than females. The disease is supposed by some to have a seasonal prevalence, but it is hard to find any particular season implicated with consistency. Keil (1940) makes the interesting statement that when one example of this condition is seen, many others are likely to be encountered at the same time.

The illness may start abruptly with the appearance of the stomatitis, skin rash or conjunctivitis. In the majority of cases there are prodromal symptoms which may last from one to thirteen days or even longer (Ashby and Lazar, 1951). The prodromal symptoms are those usually associated with a non-specific respiratory tract infection, and are often abrupt in onset; they are malaise, muscular aching, shivering attacks, rigors, fever, cough, rhinorrhœa, chest pain and vomiting. These symptoms may become worse, may decrease considerably after a few days or remain unaltered, and may then be followed by the appearance of the rash, or by soreness of the mouth and dysphagia, or by burning and itching of the eyes and photophobia or dysuria. These last-mentioned symptoms mark the onset of the stomatitis or conjunctivitis or urethritis.

Skin.

The rash, which is not a constant feature of the disease (Butler, 1922; Klauder, 1937; Keil, 1940; Henry, 1942; Lever, 1944; Soll, 1947; Wentz and Seiple, 1947), is classically described as having a predilection for the extensor surfaces of the extremities. However, Ashby and Lazar (1951), in their review of 81 published cases in which mucous membranes were involved, find that there is no constant distribution of the rash and that the report of predilection for the extensor surfaces of the extremities does not hold. Sometimes the rash is limited to a few isolated lesions on a limb (Gilbert and Hing, 1946). The only constant feature of its distribution is thought to be lack of involvement of the scalp (Keil, 1940; Ashby and Lazar, 1951); but Koke (1941) and Billow and Lowen (1952) each report a case in which the scalp was involved.

Skin lesions in patients with mucous membrane involvement are most commonly vesicles or bullæ which are sometimes hæmorrhagic, but there may be red or reddish-blue macules, papules, or "iris type" lesions. The bullæ and vesicles as a rule are surrounded by a red halo. The bullæ are often large and flaccid, and when they rupture, large areas of skin may be denuded of epithelium. Recurrent crops of papules, vesicles or bullæ may continue to appear for two weeks or more, and various elements may be present in the same case. The rash usually gives rise to trifling discomfort or none at all, and commences to clear after one to two weeks. In the majority of cases, the skin lesions have healed in three to four weeks and may leave residual staining of the skin but no scarring. Rarely, after the acute stage of the disease, the nails may be shed (Bailey, 1931; Costello, 1947; Wentz and Seiple, 1947; Anderson, Bolin, Sutow and Kitto, 1949; Steel and Moffatt, 1954).

Alimentary Tract.

There may be only a few red macules or one or two isolated vesicles in the mouth, which should therefore be carefully inspected in every suspected case of *erythema multiforme exudativum*. Erythematous macules may be quickly followed by the development of vesicles and bullæ, and in the severe case numerous vesicles or bullæ develop on the lips, tongue, cheeks and palate. More rarely, the lesions may extend into the pharynx and œsophagus (Butler, 1922). The vesicles and bullæ rupture quickly in the mouth and quite often are not seen as such. Ulceration and hæmorrhagic crusting of the lips occur; this is a characteristic feature of the more serious cases (Ashby and Lazar, 1951). Most of the mucous membrane of the oral cavity may be denuded of epithelium. A greyish-white pseudo-membrane is often seen covering the tongue, the gums, the palate, and the inner aspect of the cheeks. There is profuse salivation. As the lesions heal the membrane separates, and small or large raw hæmorrhagic areas are present; these gradually heal over without serious sequelæ.

The mouth is the most commonly involved of the mucous membranes, and frequently recurrent attacks of stomatitis may be the sole manifestation of the disease for several years (Ustvedt, 1948). The changes in the mouth give rise to intense local discomfort, and swallowing may be impossible.

The mucous membrane of the anus is often involved. Vesicles and ulcers may occur in the rectum (Koke, 1941) and may very rarely involve the colon, leading to ulceration and diarrhœa (Crawford and Luikart, 1949). Hæmatemeses have been reported by Costello (1947), and rectal bleeding by Robinson and McCrumb (1950).

Eyes.

The conjunctivitis, which as a rule is bilateral, produces only mild discomfort in the majority of cases. However, all degrees of severity may be seen, from mild catarrhal conjunctivitis through purulent inflammation to the development of pseudo-membranous conjunctivitis. The eyelids may be swollen and œdematous and their margins reddened and crusted. There may be a slight mucoid discharge or a profuse purulent discharge. Papules, vesicles and bullæ may form in the conjunctiva, the palpebral and bulbar conjunctivæ may be denuded of epithelium, and a pseudo-membrane may form. In the majority of cases the conjunctiva heals without sequelæ, particularly in the catarrhal and purulent forms. The pseudo-membranous variety may be followed by more serious sequelæ, and activity may persist in the eyes for months, healing leading to scarring of the conjunctiva and the development of symblepharon. Corneal lesions are rare, but may take the form of a superficial or deep ulcer with or without a ring abscess (Duggan and Gaines, 1951). Serious ocular complications have sometimes led to loss of eyesight (Stevens and Johnson, 1922; Rutherford, 1929; Wheeler, 1930; Bailey, 1931; Ginandes, 1935; Lever, 1944; Richards, 1946; Costello, 1947; Wolff, 1949).

Respiratory Tract.

A serous or purulent nasal discharge is often present, vesicles and ulcers may be noted on the nasal mucous membrane (Weisberg and Rosen, 1946; Lever, 1944) and epistaxis may occur (Ustvedt, 1948). Many of the patients have a cough, and expectorate blood-stained, purulent sputum. Signs of bronchitis may be present. This bronchitis is usually independent of the formation of vesicles or bullæ in the larynx and tracheo-bronchial tract, which occurs only very rarely.

Pneumonia develops in a considerable number of cases. Approximately 30% of the patients reviewed by Ashby and Lazar (1951) had pneumonia. The occurrence of the pneumonia is independent of the severity of the skin and mucous membrane involvement (Commission on Acute Respiratory Diseases, 1946) and may follow, or precede, the other manifestations of the disease by several days. The pneumonia resembles primary atypical pneumonia (Commission on Acute Respiratory Diseases, 1946; Finland,

Jolliffe and Parker, 1948; Ustvedt, 1948). It is an abacterial pneumonia, and the classical signs of consolidation are usually lacking. The physical signs are often limited to some dullness of the percussion note, diminished air entry, and a few crepitations. As is to be expected, the pneumonic process is detected only radiographically in some cases (Commission on Acute Respiratory Diseases, 1946). In addition to extensive mucous membrane involvement, nearly all the patients who died had pneumonia.

The Commission on Acute Respiratory Diseases regards the pneumonia as an integral part of the disease. However, in some cases the pneumonia may be but a manifestation of various infective processes which may precipitate the skin and mucous membrane lesions of *erythema multiforme exudativum*, rather than an integral part of the disease (*vide infra*).

Genitalia.

Lesions on the male genitalia are very common. Papules, vesicles and bullæ may be present on the penis and scrotum, and not infrequently these are the only cutaneous manifestations of the disease. *Balanitis circinata* is not uncommon, and takes the form of a reddish, macular eruption, which usually occurs on the corona and prepuce; it has a gyrate or serpiginous margin (Robinson, 1951). The development of vesicles on the *glans penis* may lead to ulceration and the development of purulent balanitis. A meatal ulcer is quite a characteristic lesion of the disease. A much smaller percentage of men and women have a true non-specific urethritis with a purulent urethral discharge. Involvement of labia and vagina may lead to the development of erosions and ulcers. Two cases of vaginal stenosis resulting from these vaginal lesions have been reported by Costello (1947).

Other Systems.

A slight generalized lymphadenopathy may occur independently of the secondary infection. The spleen has on rare occasions been reported as being slightly enlarged (Keil, 1940). Apart from arthralgia and the very rare occurrence of joint effusion and acute arthritis (Dresner, 1949; Duggan and Gaines, 1951), involvement of other systems is exceedingly uncommon. Transient changes on the electrocardiogram have been reported by Schwartz and Brainerd (1946) and by Dresner (1949). It seems likely that in these cases reported by Schwartz and Brainerd (1946), by Dresner (1949) and by Duggan and Gaines (1951), acute rheumatic fever was also present, which probably was responsible for the joint and electrocardiographic changes.

The temperature may be normal or slightly elevated for only one or two days, or greatly and persistently elevated for more than two weeks. The patient with the fully developed syndrome presents a very characteristic appearance with high temperature, severe toxæmia, and prostration. There are intense congestion of the conjunctivæ, a profuse purulent conjunctival discharge, hæmorrhagic crusting of the lips, ulceration of the mucous membrane of the mouth, a profuse skin eruption, a loose cough with purulent sputum, balanitis and urethritis. Minor forms of the disease are more common, and various permutations and combinations of the listed symptoms and signs may occur.

Apart from the rare ocular complications, in the majority of cases the lesions heal without sequelæ in two to six weeks. Sometimes the disease remains active for months, and Lever (1944) reports a case in which lesions continued to erupt in the mouth for a period of four months. Frequent recurrent attacks are a feature of some cases of the disease. Several attacks may occur each year for as long as twenty years or more (Ustvedt, 1948).

The case of a young man described by Friedmann and Pathé (1953) illustrates many of the caprices of the disease. In 1929 the man suffered from stomatitis, in 1931 he had urethritis, balanitis and stomatitis. There were frequent recurrences between 1931 and 1937. In 1936 he had intense stomatitis with dysphagia, urethritis and high fever. He had another recurrence in 1944. In 1945 he had conjunctivitis, stomatitis, tracheitis, urethritis and balanitis. There were several recurrences between 1946 and 1948. In November, 1948, he had, for the first time, cutaneous involvement with the development of bullæ, but there was no pain or fever. In January, 1950, there was a recurrence of bullous lesions on the limbs, without mucosal involvement. In November, 1950, he had a recurrence with perionychial lesions causing loss of the nails.

Special investigations do not reveal any constant findings. Apart from the changes in the mucous membranes, skin and lungs, post-mortem examination does not reveal anything of significance (Fletcher and Harris, 1945; Stanyon and Warner, 1945; Johnstone, 1947; Costello, 1947; Finland *et alii*, 1947).

Mortality.

Published reports do not give a reliable estimate of the mortality of the disease as a whole; it was 10% in Ashby and Lazar's review of 81 cases (1951) and 11% in Costello's report of 33 cases (1947). These were all serious cases. Ustvedt (1948) reported one death in his 219 cases of varying severity, which represents a mortality rate of 0·5%, or 1·25% in those cases in which mucous membrane was involved. The last-mentioned figures are probably a better guide to the mortality rate of the disease.

Differential Diagnosis.

Keil (1940) discusses the differential diagnosis in full and lists the following conditions: *erythema marginatum rheumaticum*, *erythema nodosum*, allergic purpura, acute disseminated *lupus erythematosus*, chronic bacteriæmia, Vincent's angina, pemphigus, human form of foot and mouth disease, dystrophic *epidermolysis bullosa* and drug eruption.

Ætiology.

The ætiology of the disease is still uncertain. Many of those reporting the serious form of the disease tend to favour a specific infectious agent. As no bacteria have been consistently isolated, the possibility that the disease is due to a virus infection has been put forward by many authors. Attempts to isolate a virus have revealed no definite information (Koke, 1941; Commission on Acute Respiratory Diseases, 1946; Soll, 1947; Finland *et alii*, 1948). However, Morgan and Finland (1949) claim to have isolated a strain of a herpes virus from the lungs of a patient who died of this disease. Anderson, Bolin, Sutow and Kitto (1949) observed cytoplasmic inclusion bodies in the epithelial cells of a rabbit's cornea, in which kerato-conjunctivitis had been produced by inoculation with vesicular fluid from a patient with *erythema multiforme exudativum*; in this case, the virus involved was thought not to be that of *herpes simplex*.

The condition would appear more likely to be a toxic reaction to a variety of infectious agents, particularly viruses (Ustvedt, 1948) and drugs, than to be a specific infection. Edgar and Syverton (1938) and Kove (1945) reported cases occurring some days after the onset of mumps. Several cases have occurred six to ten days after vaccination for smallpox (Fletcher and Harris, 1945; Schwartz and Brainerd, 1946; Costello, 1947; Fanney, 1949; Grant, 1953). Rook (1947) reviewed the literature on the association of *herpes simplex* with *erythema multiforme* and reported a further case in which recurrent attacks of *erythema multiforme* were always preceded by attacks of *herpes simplex*. Likewise, Womack and Randall (1953), while believing that *erythema multiforme exudativum* is probably an allergic manifestation caused by a number of different agents, held that the virus of *herpes simplex* was concerned in the pathogenesis of some cases of *erythema multiforme exudativum*. They reported a fatal case of the disease in which a generalized *herpes simplex* infection was thought to be the precipitating factor.

Chick and Witzberger (1938) reported a case associated with an oral Vincent's infection. Suggestive titres for psittacosis antibodies have been found in two patients with pneumonia (Finland, Jolliffe and Parker, 1948). In other patients with pneumonia, high titres of cold agglutinins

have been found, the pneumonia clinically and radiologically being indistinguishable from a primary atypical pneumonia (Commission on Acute Respiratory Diseases, 1946; Knutsen, 1946). However, the occurrence of *erythema multiforme exudativum* with some of the above-mentioned specific infections is infrequent enough to be regarded as not significant. Cases following parturition have been described by Dowling (1940) and by Duggan and Gaines (1951). A history of allergy is not common in patients with the serious form of the disease (Ashby and Lazar, 1951).

Because drugs are often used in the treatment of the prodromal symptoms, their significance in the ætiology of *erythema multiforme exudativum* is often difficult to evaluate. To be absolutely sure of their importance in the ætiology of the disease, it must be proved that repeated administration of the drug leads to recurrent attacks. At least three such serious cases have been reported. Two cases were related to the use of sulphonamides (Strauss, 1948; Thomas, 1950) and one to the use of a proprietary preparation for colds (Billow and Lowen, 1952). Drugs may therefore on rare occasions be responsible for *erythema multiforme exudativum*.

There may be, as Klauder (1937) suggests, an idiopathic form of *erythema multiforme exudativum* which is a specific disease entity, and a symptomatic form due to toxic causes, drugs, and reactions to infections. His points of differentiation between the two groups are not valid. If there is such a "specific" form of *erythema multiforme exudativum* (and it must be admitted that in a large percentage of cases no ætiological factor is apparent), it cannot at present be distinguished clinically or otherwise from the symptomatic form of the disease.

Treatment.

Local treatment for the eyes is required. Cortisone used as drops or as an ointment in the eyes has not been of much value in this condition (Duke-Elder, 1951). Intravenous feeding may be required for several days.

While many seriously ill patients have recovered without antibiotics (Dowling, 1940; Rosenberg and Rosenberg, 1940; Koke, 1941; Murray, 1947), antibiotics have been used systemically and topically by most authors, who stress their importance in limiting secondary infection without otherwise affecting the course of the disease. Various sulphonamides in different dosages have been used (Ageloff, 1940; Murphy, 1944; Kove, 1945; Commission on Acute Respiratory Diseases, 1946; Finland, Jolliffe and Parker, 1948), and also penicillin (Robinson, 1945; Costello, 1947; Nellen, 1947; Patz, 1947; Sears, 1947; Bradlow and Schless, 1948; Thomas, 1950; Steel and Moffatt, 1954), and various combinations of antibiotics (Gilbert and Hing, 1946; Goldfarb, 1946; Sneddon, 1947; Wright and Gold, 1947; Dresner, 1949; Silverstone, 1950; Billow and Lowen, 1952; Davies, 1953; Romer, 1953).

Antibiotics should be used for those patients with extensive mucous membrane involvement or with pneumonia. If the patient can swallow, a broad-spectrum antibiotic would seem to be the first choice; if he is unable to swallow, penicillin should be given intramuscularly.

During the last three years, ACTH and cortisone have been used in the treatment of *erythema multiforme exudativum* with mucous membrane involvement. Some authors have justified the use of these agents by stating their belief that the disease is an allergic process, others have used them empirically. ACTH has been given intravenously or by intramuscular injection. The intramuscular dosage was 10 to 25 milligrammes every six hours and the course of treatment usually lasted six to twelve days.

Wammock, Biederman and Jordan (1951), Haas, Birenbaum and Kaminester (1952), Steigman and Kelly (1952), Caldwell (1953), Clark (1953), Vandermeer, Wilson and Bulthuis (1953), and Womack and Randall (1953), each report one case of *erythema multiforme exudativum* treated with ACTH. Agostas, Reeves, Shanks and Sydenstricker (1952) report two cases, while Hauge (1952), in a series of 25 patients with *erythema multiforme exudativum*, treated nine with ACTH. In 16 of these 18 cases ACTH was thought to be of value. Improvement, which was often described as being dramatic, was sometimes manifest within twelve to forty-eight hours of starting the ACTH; one patient was moribund before ACTH was used (Agostas, Reeves, Shanks and Sydenstricker, 1952). The course of the disease was considered to have been shortened.

On the other hand, Mauriello (1954), who treated six patients with ACTH and two with cortisone, and Poske, Montgomery, Foxworthy and Baker (1954), who treated two with ACTH, while admitting that often a subjective feeling of well-being and a fall in temperature follow the use of ACTH and cortisone, considered that the disease-process was basically unaltered by their use. One of the patients described by Agostas *et alii* (1952), and two of Mauriello's (1954), developed new lesions while receiving ACTH or cortisone.

As the disease may in its natural course show a dramatic improvement seven to ten days after the onset of illness, and be completely cured without treatment within four weeks (Sneddon, 1953), it is doubtful whether the disease process has been altered even in those cases in which ACTH and cortisone were thought to have been of value, and particularly when administration of these agents has been started four to ten days after the patient's admission to hospital. It is sobering to reflect that results as dramatic as those attributed to ACTH and cortisone have in the past been attributed to penicillin (Robinson, 1945), to "Aureomycin" (Church, 1950; Lynas, 1950; Harmiston, 1952), to chloramphenicol (Grant, 1953), and even to nicotinic acid (Weisberg and Rosen, 1946) and to blood transfusion (Walton, Graham and Lansdown, 1941; Henry, 1942). In the case described by Robinson (1945), death was thought to be imminent before the use of penicillin, and the prognosis was thought to be hopeless before the use of "Aureomycin" in Church's case (1950).

Apart from their non-specific effects on the toxic and febrile aspects of the disease, it is doubtful whether ACTH and cortisone are of any value in the treatment of this condition, and their use should be limited to patients who are critically ill.

Reports of Cases.

CASE I.—A, a married female patient, aged forty-five years, was admitted to the Brisbane Hospital on October 19, 1954. On October 8 her legs had started to ache. That night she had several shivering attacks and developed a fever. The shivering attacks continued for the next two days, and she remained in bed. She developed a cough, which was productive of white sputum on October 10. On that day her private doctor found that she was febrile and that crepitations were audible at the base of her left lung. He diagnosed early left basal pneumonia. She was given two intramuscular injections, each of 900,000 units, of "Distaquaine" penicillin. On each of the next three days she received one injection of 900,000 units of "Distaquaine" penicillin. On October 11 the oral administration of "Achromycin", 100 milligrammes every six hours, was started, and this was continued until two days before her admission to hospital. After treatment was begun the patient felt much better, although her cough became worse and with the fever persisted until her admission to hospital.

On awaking on the morning of October 16 the patient noticed that her eyes were itchy, and when she went to put her false teeth in they did not seem to fit properly because her mouth felt out of shape. On the following day her mouth was swollen and was too sore for her to eat anything, her eyes were still itchy, and she noticed burning and scalding on passing urine. The day before her admission to hospital she developed a rash on the arms and legs, and her eyes and mouth seemed a little worse.

Prior to the onset of the illness she had been receiving phenobarbitone tablets for her increased blood pressure. She had had previous attacks of urticaria. Her son had had an allergic reaction after taking a dose of a popular proprietary medicine.

The patient looked very ill on her admission to hospital, and presented a striking appearance. There was a dark red maculo-papular eruption distributed symmetrically on both sides of the body. The individual lesions varied from a few millimetres to two centimetres in diameter. The rash involved the dorsum and palm of each hand and the flexor and extensor surfaces of the wrists, but was most profuse on the lateral aspect of the arms, where the lesions were

confluent and surmounted by vesicles, one to two centimetres in diameter, containing clear serous fluid (Figure I). Numerous lesions were present on the neck and face; the chin, nose and cheeks were most severely involved (Figure II). Some of the lesions here were confluent and surmounted by vesicles, and some of these were covered by crusts. Apart from the shoulders, the trunk was only slightly involved. The thighs were scarcely involved at all, and there were only a few macular or papular lesions about the knees. Many more lesions were present about the ankles. The vulva was congested. There was severe photophobia. A

FIGURE I.
Case I, showing the distribution of the rash on the upper part of the body.

profuse mucopurulent conjunctival discharge was present. The eyelids were swollen and red, and their margins were crusted with exudate. The palpebral and bulbar conjunctivæ were intensely congested. The lips were ulcerated and bleeding. Some of the blood had crusted at one end of the lips, and blood-stained saliva was being continually wiped away from the mouth. Apart from a few raw hæmorrhagic areas, the whole of the mucous membrane of the oral cavity was covered by a greyish-white pseudo-membrane. The pharynx was not involved.

The patient had a very loose cough and expectorated much purulent sputum. Her temperature was 104° F. Her respirations numbered 24 per minute. Numerous crepitations were heard at the base of the left lung. The pulse rate was 104 per minute. The apex beat was not palpable. The heart sounds were normal and the blood pressure was 170 millimetres of mercury, systolic, and 100 millimetres of mercury, diastolic. There was no lymphadenopathy, and the urine contained no albumin or sugar.

A diagnosis of *erythema multiforme exudativum*, with left basal pneumonia, was made. In view of the serious nature of the illness it was decided to treat the patient with cortisone and with intramuscular injections of penicillin, 1,000,000 units twice a day. The cortisone therapy was commenced on October 20; the patient received 100 milligrammes every six hours by intramuscular injection. After four days the cortisone was gradually reduced to a maintenance dosage of 25 milligrammes every six hours and was discontinued on November 10. A total dosage of 3·325 grammes of cortisone was given.

The day after cortisone therapy was begun the patient felt better. The only objective sign of improvement was the fall in temperature to 99° F. The next day the temperature was normal, and it remained so from then on. The rash looked less florid. The conjunctival discharge was less. On the following day the fluid in the vesicles was partly absorbed. All signs and symptoms continued to decrease from then on.

Eight days after cortisone therapy was begun the rash had faded in many areas, and where vesiculation had occurred it was starting to desquamate. Photophobia was still present. The conjunctivæ were less injected and the discharge had almost ceased. There were a slight amount of exudate and a few small raw areas still present on the lips. The greyish membrane in the mouth had mostly disappeared, and the mucous membrane had healed over in many areas. The lungs were clinically clear the next day, although the cough persisted until November 10. The eyes were considered to be normal on November 9. The patient was allowed up on November 12 and discharged from hospital

FIGURE II.
Case I, showing the distribution of the rash on the face, and the hæmorrhagic crusting on the lips. Intense photophobia is present.

on November 20. There were still some unhealed areas on the under surface of the tongue at the time of her discharge.

The hæmoglobin value was 14·2 grammes *per centum*. The white cells numbered 12,900 per cubic millimetre, of which 84% were neutrophile. The blood urea level was 45 milligrammes *per centum*. The blood failed to react to the Wassermann test. Attempts at culture from the conjunctivæ, mouth and sputum yielded no growth of pathogenic bacteria. A chest X-ray examination on November 20 revealed consolidation at the base of the left lung, which had not

cleared completely by November 11. Examination of the centrifuged deposit of the urine showed 200 leucocytes and 10 erythrocytes per high-power field on October 20, and 100 leucocytes per high-power field on October 26. Attempted culture of the urine was unproductive on October 20, but a *Proteus* species was grown on October 26. Agglutination tests for a variety of specific infections gave negative results. The electrocardiogram showed a left bundle branch block.

CASE II.—B, a male patient, aged nineteen years, was admitted to the Brisbane Hospital on November 22, 1954.

FIGURE III.

Facies in Case II, showing ulceration of lips and mouth and the presence of a white pseudo-membrane in the mouth and on the lips.

Approximately two months before his admission to hospital the patient had had an attack of "the 'flu". He developed a cough then, which had persisted. On November 20, 1954, he awoke feeling feverish, and remained in bed. The next morning his throat was sore and he noticed that there were blisters in his mouth and throat. On the morning of his admission to hospital his mouth and throat had become too sore for him to be able to swallow. When admitted to hospital that afternoon he noticed that his eyes were red and that he had some burning and scalding on passing urine. There was no personal or family history of allergy, and no history of recent ingestion of drugs.

The patient looked very ill. He had a loose cough, productive of mucopurulent sputum. His temperature was 104° F. There was a slight mucopurulent conjunctival discharge. The palpebral and bulbar conjunctivæ were intensely congested, and there were a few small subconjunctival hæmorrhages. A white exudate was present along the vermilion border of the lips. There were a few small hæmorrhagic areas on the mucous membrane of the lips. Pronounced trismus was present, and the mouth could not be adequately examined. Except for a few raw hæmorrhagic areas in the mouth, the mucous membrane of the tongue, gums, cheeks and palate was covered with a thick greyish-white pseudo-membrane (Figure III). The pulse rate was 122 per minute and the respirations numbered 24 per minute. Scattered rhonchi were audible on auscultation of the chest. Slight generalized lymphadenopathy was present.

The day after his admission to hospital a red papulo-vesicular rash appeared, and examination on the following day showed that there were about 20 vesicles scattered over the patient's back. The vesicles were approximately two to five millimetres in diameter and were surrounded by a red halo approximately 1·5 centimetres in diameter. In some of the vesicles central umbilication and drying were apparent. Eight vesicles were present on the face. One under the chin was slightly hæmorrhagic. The remainder of the vesicles were distributed as follows: four on the flexor and extensor surfaces of the right forearm, two on the right arm, one on the left arm, four on the chest, and two on the left ankle. Several vesicles were present on the skin of the scrotum. On the left side of the body of the penis there were eight vesicles which tended to coalesce. The external urethral orifice was surrounded by a circular ulcerated area about 1·5 centimetres in diameter (Figure IV). There was a purulent urethral discharge, and the margins of the urethral orifice were glued together and obscured by exudate. There were two small vesicles on the *glans penis* and a ruptured vesicle was present on the anus. A diagnosis of *erythema multiforme exudativum* was made.

Intramuscular injections of 40 units of ACTH every six hours were started on November 23. After four days the patient showed no response to this treatment. His cough was still very troublesome, his mouth was too sore to allow him to eat, and he had to be given fluids intravenously. There was a purulent ulcerated area around the urethral meatus, the patient could not pass urine, and his bladder had to be catheterized for several days. His temperature remained elevated. The ACTH was discontinued on November 26, the patient having received 480 units. Cortisone, 25 milligrammes every six hours by intramuscular injection, was then administered along with intramuscular injections of penicillin, 500,000 units every six hours, and streptomycin, half a gramme twice a day. There was a gradual improvement, but the patient did not become afebrile until November 30. On December 3 the cortisone was discontinued, the patient having received 1·4 grammes. By then the rash had started to desquamate, the eyes were almost normal, the cough was less and the mucous membrane of the mouth was healing. The patient was discharged from hospital on December 8. When he was examined in the out-patient department on December 17 the mucous membrane of the mouth was not completely healed.

FIGURE IV.

Case II, showing the meatal ulcer.

The patient's hæmoglobin value was 12·8 grammes *per centum*. The white cells numbered 5600 per cubic millimetre; 73% were neutrophile. Cultures from the throat and sputum grew a penicillin-resistant coagulase-negative staphylococcus. No pathogenic bacteria were isolated from the conjunctiva, vesicular fluid or urine. The blood yielded a doubtful positive Wassermann reaction but no reaction to the Kahn and Kline tests. The chest X-ray appearances and the electrocardiogram were normal.

After being out of hospital for twenty-three days the patient was readmitted on January 1, 1955. After December

17 his mouth had remained slightly sore (it seems unlikely that his mouth had completely healed by the time he was readmitted). Three days before his second admission to hospital he noticed ulcers reappearing on his lips. That night it became almost impossible for him to swallow. When he swallowed he experienced severe retrosternal pain, which spread across the front of his chest and lasted some minutes. The next day the pain become more or less continuous, but was still made worse by swallowing. Extending the head also made the pain worse, made him feel faint, and induced a desire to vomit.

On physical examination the patient appeared to be in severe pain. There were two strips of unhealed mucosa 2·0 centimetres by 0·5 centimetre in area on the inside of each cheek, and four sodden vesicles approximately 0·5 centimetre in diameter on the mucous membranes of the lips, and one under the tongue. His temperature was 100° F. The rest of the physical examination revealed no abnormality.

A diagnosis of an exacerbation of *erythema multiforme exudativum* with stomatitis and œsophagitis was made. The patient was treated with intramuscular injections of penicillin, 200,000 units every six hours, for eighteen days, and given fluids by mouth and morphine for the pain.

New vesicles continued to appear in the mouth for the next twelve days. A few small ulcers developed in the tonsillar fossæ and led to the complaint of a sore throat six days after his admission to hospital. The patient was unable to eat solid food for about two weeks. Eleven days after his admission to hospital he complained of burning and scalding on passing his urine, and examination of the margins of the urethral meatus revealed slight excoriation and swelling for about two millimetres. There was no urethral discharge. He became afebrile on January 6. By January 17 his mouth was almost healed, and he was discharged from hospital on January 21.

The white cells numbered 8300 per cubic millimetre, 75% being neutrophile cells. The chest X-ray appearances and electrocardiogram were normal. The Wassermann test yielded an incomplete reaction on his admission to hospital, but no reaction on his discharge. Attempted cultures from the throat and the vesicles in the mouth yielded no growth of pathogenic bacteria.

CASE III.—C, a boy, aged eight years, was admitted to the Brisbane Children's Hospital on December 21, 1954. He was complaining of sore eyes following an attack of "severe measles" three and a half months before. The history obtained from the boy and his mother was as follows. The boy had been in excellent health until the middle of August, 1954, when he developed a "cold" and was given sulphonamide tablets for some days. The cough decreased and had disappeared within one week. He felt well for a few days. Eleven days after the onset of the cough he returned to school. That day he again felt unwell and developed a fresh cough. The following morning his eyes became sore, and the next day he developed a rash. At some time during these three days his mouth also became sore and he had difficulty in swallowing. His condition became worse, and seven days after the recrudescence of the cough he was admitted to a country hospital. It was stated that his eyelids and face were then swollen, his eyes were very red and there was a purulent ocular discharge. A red rash was present over all the body, including the scalp. The lips were crusted and red. The mouth was ulcerated and he had to suck fluids through a straw. His condition deteriorated in hospital and he developed pneumonia. He "broke out in sores" and the skin peeled off, leaving large raw areas on his body. In spite of the use of various antibiotics, his condition became critical and it was thought that he might die. After being seriously ill for the first week in hospital he started to improve, and nineteen days after his admission he was allowed to go home prior to his transfer to Brisbane for further treatment. At this stage his eyes and mouth were still sore. A large part of the skin on his body had cleared; there was a "white blister" in his mouth. The cough had decreased.

Two to three days after discharge from the country hospital he developed new red spots on his body and his temperature rose. The spots were unlike the earlier rash and disappeared within a few days. His toe and finger nails then started to peel off. He was admitted to a Brisbane hospital on September 30, and apart from the eye condition all signs of the disease had resolved. There the eye condition was treated for two months with "Aureomycin" ointment, but showed no improvement. The parents requested a further opinion, and he was admitted to the Brisbane Children's Hospital. When admitted to hospital he felt perfectly well except for his eyes, which were sore when exposed to the light. There was a family history of allergy—his mother suffered from hay fever and an uncle had asthma.

On physical examination he was found to be a well-developed and intelligent boy. There was a mottled brown pigmentation of the skin of the body. The finger nails were ridged and frayed at the edges and were growing again. Severe photophobia was present. There was a slight purulent discharge from both eyes, more severe in the right. The eyelids were swollen and reddened. There was a gross loss of conjunctival epithelium in both eyes, and in the right eye there was a small non-staining corneal opacity.

The eye condition was treated with 1% cortisone ointment four times a day and 10% sulphacetamide ointment three times a day. The eye condition, apart from some healing of the conjunctiva in the left eye, did not improve while the boy was in hospital, and on his discharge on January 25, 1955, there was gross photophobia with lachrymation in both eyes. The right eye was worse than the left. The lids were bathed in exudate and the lid margins were reddened. There was a patchy loss of epithelium of the conjunctiva. On the right cornea there were two dense opaque areas about one millimetre in diameter, which were not stained by fluorescein. It now appeared that symblepharon would occur between the ocular and palpebral conjunctivæ of the upper right eyelid.

This case, although not observed by me during the acute phases of the illness, was undoubtedly a severe case of *erythema multiforme exudativum*.

Discussion.

These three patients were seriously ill; in Case III the patient was critically ill at one stage. However, only in Case III did any sequelæ occur. The disease process is still active in the boy's eyes and it appears likely that he may ultimately suffer some impairment of vision in the right eye.

Two patients (Cases I and III) had pneumonia. In Case I this preceded the other manifestations of the disease. In Case III the patient had a respiratory infection eleven days before the onset of his severe illness. In both cases drugs were prescribed for the respiratory infections; these may or may not have played a part in the development of the disease. There was no obvious ætiological factor present in Case II.

Case II illustrates the possible long duration of the disease, the great variation in severity and the manifestations at different times, the inconstant nature of the rash, and the rare development of œsophagitis.

The administration of cortisone and penicillin in Case I led to a feeling of subjective improvement, and the temperature fell and other signs became less pronounced after the use of these agents. Cortisone did not expedite the patient's discharge from hospital, and it is doubtful whether it influenced the disease process in any significant manner. In Case II there was no response to ACTH, the temperature and other signs being unaffected by its use. The cortisone, first given late in the course of the disease, probably had no effect on its ultimate resolution.

Summary.

1. The varied clinical manifestations, the ætiology and the treatment of *erythema multiforme exudativum* are reviewed.

2. Three cases of the serious form of the disease with extensive mucous membrane involvement are reported; in two of them cortisone was used in treatment.

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OBSERVATIONS ON THE BEHAVIOUR OF ANOPHELES FARAUTI LAVERAN, AN IMPORTANT MALARIA VECTOR IN THE TERRITORY OF PAPUA-NEW GUINEA.[1]

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A STUDY has been made of certain aspects of the behaviour of *Anopheles farauti* during three visits to the Territory of Papua-New Guinea made in the period 1952 to 1954 at the invitation of the Administration to conduct experiments in village malaria control. This paper contains the results of these observations, which were especially confined to determining the amount of indoor resting of this species in the daytime, examining the outdoor resting places and investigating its host preference. Some other observations are included, but many aspects of behaviour could not be studied.

It is obviously of importance to determine the behaviour of vector species in this area, as the wartime impression gained of the behaviour of the Papua-New Guinea vectors has delayed the adoption of control measures in which DDT is used as a residual insecticide (World Health Organization, 1954).

[1] Published with the permission of the Director-General of Health, Commonwealth of Australia.

METHODS.

A. farauti resting indoors in the daytime was sought by the light of a torch, and resting mosquitoes were caught in test tubes. The anophelines were most easily seen when viewed from above with the light shining on their upper surfaces, when they appeared as white exclamation marks.

Outdoor catches were made at night, native children or adults being used as bait, and the mosquitoes were taken in test tubes. Native children were of great assistance in catching *A. farauti* resting out of doors once the characteristics of the resting places had been explained to them.

The blood of engorged mosquitoes was expressed on to filter papers, and the source of the blood meal was determined by precipitin tests made in capillary tubes.

RESULTS.

Daytime Resting Habits.

The observations made on the daytime resting habits of *A. farauti* are described hereunder.

Resting Indoors.

Catches were made of *A. farauti* resting indoors in the daytime in a number of localities in Papua-New Guinea. These localities varied in altitude from sea level to 5100 feet (Minj) and were situated on small islands, in the coastal area and coastal plain of the mainland, and in the highlands. The map (Figure I) shows the areas in which the catches were made.

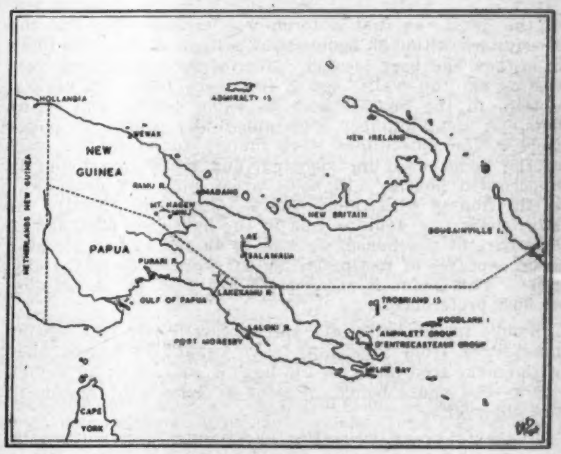

FIGURE I.
Territory of Papua-New Guinea, showing localities mentioned in the text.

In addition to *A. farauti*, a smaller number of other species of anophelines and many culicines were captured. Table I shows the details of the anopheline catches in the various areas visited during the period from March to May, 1954. The total of 282 anophelines captured resting indoors in the daytime comprised the following: *A. farauti* (232), *A. subpictus* (35), *A. bancroftii bancroftii* (12), *A. punctulatus* (2), and *A. annulipes* (1). All these were females. Of a group of 134 *A. farauti* mosquitoes captured resting indoors in the daytime, 128 (96%) were found to be engorged.

These captures of *A. farauti* resting indoors in the daytime were made in houses of a variety of styles. Some were built with the earth as the floor (Minj, Trobriands, Laloki), others were raised six feet above the ground (Ampletts, Milne Bay). The houses were built from both European and local native materials, so that the walls on which *A. farauti* were found include planks, "Masonite" (pressed wood), "Sizalkraft", corrugated iron, woven

bamboo, dry grass, pandanus leaf, and woven coconut fronds. The number of rooms in the houses varied from one, as in the Trobriands, to several, as in the European-type houses in the Milne Bay area.

A. farauti was found resting up to heights of about four feet on the walls, but was usually lower, especially at Minj, where it was never found more than seven inches above the ground. This contrasted with the height above the floor at one locality in Milne Bay, where a moderately large number of *A. subpictus* mosquitoes were taken resting indoors. Here this species was found on walls of houses at heights of six feet and more above the floor, although many were taken much closer to the floor. The resting site of *A. farauti* was almost invariably in a shaded part

TABLE I.

Details of Catches of Anophelines Resting Indoors in the Daytime in Papua-New Guinea from March to May, 1954.

Area.	Locality.	Anophelines.
Western Highlands.	Minj.	*A. farauti*, 15. *A. bancroftii bancroftii*, 12. *A. annulipes*, 1.
Port Moresby.	Laloki River.	*A. farauti*, 6. *A. punctulatus*, 1.
Amphlett Islands. Trobriand Islands. Milne Bay.	Wahea Island. Thirteen localities. Four localities.	*A. farauti*, 5. *A. farauti*, 202. *A. farauti*, 4. *A. subpictus*, 35. *A. punctulatus*, 1.

of the house, so that a torch was necessary to find the mosquitoes, although some could be seen without the torch once they had been located. Most of the anophelines were resting on the walls, but a few were found on various objects in the houses, such as yams, bottles and string nets. A small number were apparently caught in spider webs. The mosquitoes were mainly found in that part of the house used for sleeping, and none were found in unoccupied houses. In some areas pigs and dogs sleep in the houses with their owners (Trobriands, Minj). At Minj there is a definite area in the house for pigs, and in this part of the house, as well as in the human sleeping area, captures of resting *A. farauti* were made in the daytime. This point is referred to again in the description of host preference.

Smoke in the house did not appear to drive the resting mosquitoes from it. Many were caught in houses filled with smoke from fires used either for cooking or for drying copra—the smoke being sufficient to cause lachrymation in the observer.

In coastal areas the resting anophelines were not usually disturbed when the torch was shone upon them; but they appeared to be more readily disturbed at Minj, and frequently burrowed into the grass walls or flew away. When they were disturbed during catching operations, some flew for a few inches and rapidly settled again; others flew away and were lost from sight.

The numbers caught in houses varied, of course, with the locality. The greatest density was observed at Kaisiga in the Trobriand Islands, where 50 were taken from six square feet of wall in one house. No serial observations were made of day-to-day densities in houses; but in this house at Kaisiga just mentioned a catch three days before had resulted in the capture of only six *A. farauti* mosquitoes.

Some search was made of the thatching of roofs, but only on the visible under-surface, and was not productive of results.

Anophelines caught in mosquito nets have not been mentioned in this description; but one catch of 12 engorged females taken in a mosquito net in a labour barracks at Kana Kopi Bay (Milne Bay area) comprised four species, as follows: *A. subpictus* (1), *A. farauti* (7), *A. punctulatus* (3), *A. koliensis* (1).

Resting Out of Doors.

Catches of *A. farauti* resting out of doors in the daytime were made at Kaisiga in the Trobriand Islands and at Minj in the western highlands of New Guinea. The total catch numbered 234 and comprised the following: 228 females and one male at Kaisiga, and five females together with four *A. bancroftii bancroftii* mosquitoes at Minj. Of the total of 233 female *A. farauti* mosquitoes, 178 (76%) were engorged.

The daytime resting site of *A. farauti* at Kaisiga was close to the edge of the village clearing and approached to about 40 yards from the nearest house. In this area were growing coconut trees, moss, a lily (*Crinum asiaticum*—Trobriand *morobaw'u*), grass, vines, and ferns both on the ground and on the coconut trees. The ground was damp, but at the time there was no surface water in this particular area. The anophelines were found mostly around the shaded roots or stumps of coconut trees; 26 were captured from the roots of one coconut tree. Others were found resting on the trunk of the lily, on grass stems, on vine leaves, and on the stems of ferns near the ground. The maximum height above ground at which the anophelines were seen resting was two feet, but the great majority were found less than one foot from the ground.

At Minj the native people live in small hamlets or single houses built in or close to their gardens. Near one such house in a garden a few *A. farauti* mosquitoes were found in the shade produced by the low house, banana trees and the leaves of taro. The ground was damp and there was moisture on the moss growing on the ground. The anophelines were found within a few inches of the ground, resting on the dead sodden stem of a taro leaf, a banana trunk, a grass stem, a dead stick, and the outside of the grass wall of the house.

The outdoor resting sites, both at Kaisiga and at Minj, were in shaded areas, but the mosquitoes were readily seen by daylight. In both places the ground was damp and the

FIGURE II.

Entrance to a house at Dimbina (near Minj) in the Western Highlands of New Guinea.

local humidity must have been high. At Kaisiga, if resting engorged *A. farauti* mosquitoes were disturbed, they usually settled again rapidly on a place close to the original one; some settled on green jungle boots. Disturbed unengorged *A. farauti* mosquitoes would often bite man. On a few occasions at Minj disturbed resting anophelines flew away out of sight.

Observations on Biting Habits.

Biting in the Daytime.

It has been mentioned that 4% of the *A. farauti* mosquitoes found resting indoors in the daytime were not engorged. On a few occasions, when catches were being made indoors in the daytime, *A. farauti* was observed biting man. Presumably these insects were unengorged

females which had been disturbed and found conditions within the house suitable for biting. In one small house two *A. farauti* mosquitoes were taken biting in the daytime when there was voluminous smoke from a fire used for drying copra.

Biting out of doors in the daytime was observed on several occasions. The biting of man by disturbed unengorged *A. farauti* in the resting site at Kaisiga has already been described. Also at Kaisiga an attack on man by a moderate number of *A. farauti* mosquitoes was observed in a shaded area near the breeding grounds. This attack appeared to take place spontaneously—the resting anophelines had not been physically disturbed. At Minj one *A. farauti* was taken biting man, in the middle of the day, in a garden in the light shade of a casuarina tree. This garden was about 50 yards from two houses and was apparently the resting site for *A. farauti*.

Biting at Night.

Most observations on night-time biting were made at the edge of village squares (Trobriands, Milne Bay), or just outside isolated houses (Minj), native children being used as bait. With the children standing, the great majority of *A. farauti* mosquitoes sought their blood meals from the toes, feet and ankles and the lower parts of the legs, although the upper parts of the legs, the trunk and the arms were exposed. Children in the Trobriand Islands were well aware that they were being bitten; indeed, at Kaisiga, where the anopheline population was large, they were somewhat exasperated by the relatively slow method of catching the anophelines in test tubes. Additional evidence of irritation by the bite of *A. farauti* was provided by the marks of scratching on the legs of the children used as bait. At East Cape (Milne Bay area) adult male natives were used as bait, and most of the anophelines had to be caught by regular inspection, as the adults did not appear to be aware that they were being bitten. However, *A. farauti* can be a pest mosquito for adult natives—this was observed at Kaisiga. In two Europeans bites by *A. farauti* were followed by the formation of papules with some surrounding erythema.

When night catches were being made, with the use of children as bait, it appeared that some children were much more attractive for *A. farauti* than were the majority of the group. No comparison was made between the relative attraction of white and dark skins; to do this an adequate sample from each group would be necessary to compensate for individual differences in both groups.

During the act of probing *A. farauti* was often disturbed by the light of a torch and flew away. A similar reaction was obtained when the mosquito was fully engorged, with blood dripping from the anus. However, when actively feeding, *A. farauti* was on most occasions dislodged only with difficulty by means of a test tube in the bright light of a torch.

Light rain and a light breeze did not appear to deter *A. farauti* from biting out of doors at night.

Biting indoors at night in rooms lit by kerosene pressure lamps was observed on several occasions. Here *A. farauti* bit on a shaded, exposed part of the body.

Comparison of Night Catches with Numbers Found Resting Indoors in the Daytime.

In Table II are presented the results of night catches in three areas (Trobriands, Milne Bay, Minj), along with the results of house searches in the daytime. A few conclusions only can be drawn from this comparison. Where the night catches were small (Kavataria, Waga Waga), few or no *A. farauti* mosquitoes were taken resting indoors in the daytime. The large indoor catch at Kaisiga was associated with a large population biting out of doors at night. However, the moderately large night catch at East Cape was coupled with the finding of no *A. farauti* resting indoors in the daytime. It should be mentioned here that when the search of houses was made at East Cape a brisk south-east trade wind was blowing. At Waga Waga in the Milne Bay area one *A. subpictus* was found resting indoors in the daytime; but none of this species was taken in the night catch, which comprised four specimens of *A. farauti* and three of *A. longirostris*. However, these two catches were made at opposite ends of the village, which extends for several hundreds of yards along the shore. At Minj moderately large night catches were associated with few mosquitoes resting indoors in the daytime. In this area the days are comparatively dry, the mean relative humidity at midday varying between 44% and 53% throughout the year. In addition, the small number of houses in hamlets contrasts with the larger number in village groups in other areas.

Host Preference.

Observations on *A. farauti* biting animals other than man were limited to an occasion on which one was seen to bite the foot-pad of a recumbent dog at night in an area of high anopheline density. However, blood spots were made from adult females captured resting indoors and out of doors at Kaisiga (Trobriand Islands). At this village there are many domestic pigs and dogs, but no cats or poultry. There are scrub turkey nests near the village. Blood spots were also made from anophelines captured resting indoors and out of doors in the daytime in the Minj area. Here there are pigs, which spend the night in stalls in the houses, but very few dogs and hens.

The results of the precipitin tests made on these blood spots are presented in Table III, which includes results obtained from *A. bancroftii bancroftii* caught in the Minj area. It will be seen that the great majority of *A. farauti* mosquitoes resting indoors in the daytime at Kaisiga had fed on man, while at Minj about one-half had fed on pigs and one-half on man. Of those resting out of doors at Kaisiga, about one-half had fed on man and one-quarter on pigs and one-fifth on dogs, whereas at Minj the few specimens caught had fed on pigs only. Specimens of *A. bancroftii bancroftii* caught resting indoors and out of doors at Minj had all fed on pigs.

TABLE II.

Comparison of Night Catches of A. farauti with the Number Taken Resting Indoors in the Daytime.

Area and Locality.	Night Catch.				Resting Indoors—Daytime.		
	Number of *A. farauti*.	Method.			Number of *A. farauti*.	Method.	
		Catchers.	Hours.	Bait.		Catchers.	Hours.
Trobriand Islands:							
Kavataria	7	1	1	10	3	1	1
Kaisiga	79	2	0·5	18	92	1	1·5
Milne Bay:							
East Cape	52	2	1	10	0	2	0·5
Waga Waga	4	2	1	10	0	2	1
Minj:							
Dimbina	61	4	1·5	4	4	3	—
Kolia	22	4	1·5	3 to 6	0	1	—

TABLE III.

Results of Precipitin Tests Made with Blood Spots from Anophelines Caught Resting Indoors and Out of Doors in the Daytime.

Species.	Daytime Resting Site.	Results of Precipitin Tests.					
		Man.	Pig.	Dog.	Fowl.	Negative.	Total.
A. farauti	Indoors:						
	Kaisiga ..	58	0	0	0	1	59
	Minj	6	7	—	—	0	13
	Outdoors:						
	Kaisiga ..	45	23	19	1	8	96
	Minj	0	4	—	—	0	4
A. bancroftii bancroftii	Minj:						
	Indoors ..	0	10	—	—	0	10
	Outdoors ..	0	2	—	—	0	2

Mite Infestations of Adult A. farauti.

In seven localities in the Trobriand Islands, and also at Minj in the western highlands, hydrachnid mites were found on *A. farauti* adults. The greatest proportion of specimens of *A. farauti* found carrying these parasites was at Kaisiga, where the anopheline density was high. Of 112 *A. farauti* mosquitoes captured resting indoors in the daytime, 56 (50%) carried mites; of 79 taken biting in the village square at night, 38 (48%) were infested; and of 172 resting out of doors in the daytime, 65 (38%) bore mites. Of the mosquitoes caught biting in the village square and resting out of doors in the daytime, the proportion bearing mites was significantly different ($\chi^2 = 4{\cdot}13$, $p < 0{\cdot}05$). The number of mites carried by the anophelines varied from one to twelve.

Breeding Sites.

The water collections chosen by *A. farauti* for oviposition are well known as being ubiquitous and diverse. On the Trobriand Islands, which are of coral origin, where most of the larval collections were made (Black, 1954*b*), *A. farauti* larvæ were found in roadside (wartime) borrow pits, shallow wells, water pools reached by the higher tides, swamps behind the crest of the beach, pig wallows, a cement drip trap beneath a tap, 44-gallon drums sunk in the earth, natural holes in coral, pools of water impounded for drinking, depressions containing rain-water, permanent inland swamps, especially where shallow wells were dug at the edges, and impounded water used as a duck pond. In the Amphlett Group *A. farauti* larvæ were found in a pig wallow hole in a seepage area at the foot of one of the steep mountains. At Minj, *A. farauti* larvæ were taken in seepage areas amongst the kunai grass and in a blocked drain.

Some of these breeding sites were perennial, while others were temporary and seasonal. Many of those near the sea contained brackish water. When the larvæ were found in clear water, usually some light shade or perhaps shelter was available, even though this was merely due to dead leaves on the surface, to grass growing in the water or to the raised edge of the pool or drain. The larvæ were found in turbid water pools which were completely unshaded. These observations on the light shading of breeding sites did not always apply, as one pool of impounded clear water was completely unshaded and contained numerous larvæ. No larvæ were found in densely shaded pools. No *A. farauti* larvæ were found in recently opened coconut shells. In one swamp on the Trobriand Islands, which depended to a large extent on continued rain for its persistence, numerous *A. farauti* larvæ were found. As the swamp dried out, the larvæ remained in the water caught in old coconut shells lying in the swamp bed. They were also found to have retreated down into large crab holes which still contained water. When the swamp filled again with heavy rain the larvæ migrated from these retreats into the general swamp area.

Species of Anophelines Encountered at the Localities Visited.

The species encountered may be listed briefly as follows: Trobriand Islands: *A. farauti*, *A. longirostris*; Amphlett Islands: *A. farauti*; Milne Bay: *A. farauti*, *A. punctulatus*, *A. koliensis*, *A. subpictus*, *A. longirostris*; Laloki River: *A. farauti*, *A. punctulatus*; Minj, *A. farauti*, *A. annulipes*, *A. bancroftii bancroftii*, *A. punctulatus*.

DISCUSSION.

Indoor resting in the daytime has been frequently observed with *A. farauti* in the other malarious territories of Melanesia. (New Hebrides: Belkin *et alii*, 1945; Black, 1954*a*; Cheesman, 1932; Daggy, 1945; Herivaux *et alii*, 1939. Solomon Islands: Belkin *et alii*, 1950; Perry, 1950. Netherlands New Guinea: Black, 1954*b*; de Rook, 1935; van Theil and Metselaar, 1954.) In Papua-New Guinea, Heydon (1923) reported the finding of both *A. farauti* and *A. punctulatus* resting indoors in the daytime at Rabaul (New Britain), in hospital wards, in his own bungalow, and in native quarters and houses. He found them chiefly in the wet season. They were located on walls often near the ground, on undersides of beds and in sheltered and dark situations. Backhouse (1954) stated that he was unable to find *A. farauti* resting indoors in the daytime when he was at Rabaul. At Lalapipi (Papuan Gulf), Atherton and Lemerle (1943) found that a minority of *A. farauti* mosquitoes remained in dwellings during the day in cool dark corners, under the thatch and in generally sheltered positions. English (1943) stated that *A. punctulatus* (*punctulatus* and *farauti*) did not harbour by day in huts or tents unless present in enormous numbers. Mackerras and Aberdeen (1946) were unable to find a single resting anopheline by day in huts near Wewak (Hwain river), where a night catch of 483 (98% *A. farauti*) had been made in eight hours. They concluded that this species was essentially a house visitor and not a house dweller. Bang *et alii* (1947) reported *A. farauti* resting indoors at Lalapipi (Papuan Gulf), at Nadzab and Salamaua (New Guinea mainland) and in the Admiralty Islands. Roberts and O'Sullivan (1948) reported that *A. punctulatus* mosquitoes (*farauti*, *punctulatus*, *koliensis*) were rarely found resting indoors in any numbers at Salamaua and Mirivasi (Papuan Gulf). However, on one occasion they found large numbers by day in huts of a native compound at Nadzab, near Lae (New Guinea mainland). Here engorged females, chiefly *A. farauti*, were found resting in moist holes in the ground, inside boxes and on the walls and roof.

It is apparent from these reports that different observers have obtained different results, and that even the same observer has had varying results in different localities. It has been noted during the work reported in this paper that catchers vary in their ability to locate resting anophelines. It has also been noted that the numbers resting indoors in the same house on different days vary greatly (Kaisiga). It is suggested that those who have failed to find any specimens of *A. farauti* resting indoors on a particular occasion have made their search when conditions have not been suitable for *A. farauti* to rest indoors. Shade is the only factor common to these reports of indoor resting in the daytime. Moisture, sheltered situation and coolness are also mentioned. It is unfortunate that no serial observations in Papua-New Guinea have been made over a prolonged period of time and correlated with climatic and other data. Atherton (1944*b*)

pointed out that the number of female *A. farauti* mosquitoes entering living quarters varied considerably from one evening to another, even when the same number of occupants was present. This variation was closely correlated with the weather. At Minj, where the days are relatively dry, *A. farauti* is found only within a few inches of the ground indoors. On the coast, where the atmosphere is more humid, *A. farauti* is often found at higher levels indoors. It would appear that this species remains indoors when the day comes only if there is sufficient moisture. Other factors may operate to drive it out of the house; however, smoke does not appear to be one of these. In

FIGURE III.
A house in the Trobriand Islands.

some native houses the sleeping rugs are rolled up against the wall, and it is apparent that there is much disturbance in the house each morning. Light airy houses may not be attractive for daytime resting. On the other hand, factors may operate to persuade this species to remain in the house during the day, such as wind and rain in the early morning.

There have been numerous observations of *A. farauti* resting indoors at night in Papua-New Guinea—Atherton and Lemerle (1943) at Lalapipi, Waterhouse (1943) at Lalapipi, Atherton (1944*a* and *b*) in the Ramu Valley, Roberts (1944) at Salamaua, Mackerras and Aberdeen (1946) at Wewak, Bang *et alii* (1947), Roberts and O'Sullivan (1948) at Salamaua and Mirivasi. Both fed and unfed females have been observed resting indoors at night, for periods in excess of an hour, on walls of huts and tents, roofs as high as one can reach, furniture, beds and mosquito nets. The stimulus to leave the dwelling remains uncertain. The results presented here show that of those *farauti* mosquitoes remaining in the houses during the day, only 4% are unfed. Atherton and Lemerle (1943) suggested that some specimens of *A. farauti* remained in houses because they had not had a blood meal or were interrupted when partly fed. In Hollandia (Netherlands New Guinea), van Thiel (1954) suggested that the light of dawn provided the stimulus for *A. farauti* to leave houses in which it had lingered during the night. It is suggested that if this is so, those mosquitoes resting in shaded places do not receive the stimulus and remain indoors if other conditions such as humidity and freedom from disturbance are suitable. This would explain why the daytime resting sites indoors are not the same as those where *A. farauti* has been observed resting at night.

The search for *A. farauti* resting outdoors has usually been more successful in Papua-New Guinea than the search indoors in the daytime. Outdoor resting places for this species have been described by Atherton and Lemerle (1943), by Atherton (1944), by Horsfall and Porter (1946), by Bang *et alii* (1947), by Waterhouse and Atherton (1947), by Roberts and O'Sullivan (1948), and by Laird (1952) from widespread areas in Papua-New Guinea. The characteristics of these resting places are that they are moist, shaded, cool, close to the ground and not far away from the source of the blood meal. The observations presented in this paper add to the list of vegetation types which provide these suitable conditions. It should be noted that outdoor resting sites are generally much more moist than those indoors, but that the amount of light present is

FIGURE IV.
Outdoor resting site of anophelines at Dimbina (Western Highlands).

much greater. This may support the suggestion that the amount of moisture indoors determines, to some degree, whether *A. farauti* will remain indoors in the daytime.

The considerably lower percentage of engorged *A. farauti* mosquitoes resting outdoors (76%) compared with those found indoors (96%) is of interest ($\chi^2 = 15{\cdot}1$; $p < 0{\cdot}001$). The unengorged *A. farauti* mosquitoes presumably were unable to secure a meal on the previous night, or their flight brought them only as far as the daytime resting sites.

Discussion by authors of the host preferences of *A. farauti* in Papua-New Guinea has been based on the wartime

precipitin results of Heydon (1944*a* and *b*) from material collected by army entomologists. Mackerras (1947) reviewed the evidence for host preference gathered during the war years, and concluded that *A. farauti* associates with man and his domestic animals, but has no particular feeding preferences, whereas *A. punctulatus* (at Milne Bay) is strongly anthropophilic. However, it should be clearly understood that in very many areas of this territory hyperendemic malaria is maintained by *A. farauti* alone without the aid of *A. punctulatus*, which latter species greatly impressed the observers at Milne Bay in 1942 with its ability to act as a vector.

The statement made by Mackerras (1947) that the "examination (by the precipitin test) of mosquitoes caught in dwellings . . . is open to grave suspicion in this region where the Anophelines generally enter dwellings to feed rather than to rest, so that there is a high *a priori* probability that any found engorged indoors will contain human blood" may have been correct when applied to the dwellings of service personnel. In the civilian population many of

FIGURE V.

Outdoor resting site of *A. farauti* at Kaisiga (Kaileuna Island, Trobriand Group).

the natives keep their pigs, dogs, cats and fowls in their houses at night, so that any anopheline entering the house has a choice of animal for its blood meal. Wharton (1953) has pointed out that *A. maculatus* in Malaya prefers to feed on cattle, but will feed on man even when cattle are present and is a dangerous vector in that country. It would appear that *A. farauti* shows similar behaviour, and that its attraction towards man is sufficient to support high degrees of malarial endemicity even in the presence of other animals.

It was hoped that the significant difference in the degree of hydrachnid infestation in the group of *A. farauti* resting indoors and out of doors might provide some information about the behaviour of this species. The Sergents (1904) stated that infestation with water mites did not adversely affect the life of anophelines. Banks (1915) held that attachment of a hydrachnid to a mosquito was suicidal on the part of the mite, although Brown (1936) has observed considerable increase in size of mites which had been attached to mosquitoes for a few hours. Marshall and Staley (1929) described the formation of serpentiform tubules in the superficial part of the mosquito commencing at the site of attachment of the mite. They did not suggest that this shortened the life of the mosquito.

When the mite-infested specimens of *A. farauti* were collected by means of a sucking bottle, it was found that the mites were brushed off the mosquitoes. It is possible that the lower infestation rate in the *A. farauti* taken resting out of doors may be due to the mites having fallen off or being brushed off the mosquitoes rather than to the mites having killed their hosts. Until further observations have been made on the mite-anopheline relationship, no definite conclusions can be drawn. The same degree of mite infestation in the group biting near the village square and that resting indoors in the daytime is of interest.

With regard to the breeding sites where *A. farauti* larvæ have been found, the only point of interest is the finding of larvæ in the crab holes in the bed of a receding swamp. At Rabaul (Territory of New Guinea, 1936) anopheline larvæ (probably *A. farauti*) were found in the innumerable crab holes along the foreshore. In oiling operations much time was consumed in locating and treating them. Descriptions of breeding sites have been given for Papua-New Guinea by Atherton (1944*a* and *b*), by Heydon (1923), by Horsfall and Porter (1946), by Laird (1945, 1952), by Perry (1950), and by Roberts and O'Sullivan (1948).

Daytime biting by *A. farauti*, indoors and out of doors, has been recorded by several observers in the Solomons and New Hebrides (Belkin *et alii*, 1945; Black, 1952, 1954*a*; Cheesman, 1932; Daggy, 1945; Paine and Edwards, 1929). In Papua-New Guinea Atherton (1944*a* and *b*) and Atherton and Lemerle (1943) have reported *A. farauti* biting in the daytime in huts and tents and in shaded places out of doors.

When DDT became available to the army during the war, experiments with *A. farauti* were made on its effect as a residual spray. Roberts (1944) tested the repellent action of DDT, and Waterhouse (1943) its persistent lethal effects. Bang *et alii* (1947) sprayed native villages in the Papuan Gulf area. This work was done with DDT dissolved in kerosene, which has more recently been shown to be an unsuitable prescription for use with houses made of some native materials. Although Bang *et alii* reported favourable results, in post-war years residual spraying of houses for malaria control was not advocated as a method likely to be of use in Papua-New Guinea, despite the numerous wartime observations of *A. farauti* resting indoors at night and to a limited extent in the daytime. However, Ford (1950) stated that, of the newer methods of control, DDT residual spraying appeared to offer most advantages in Papua-New Guinea. The experimental work of van Thiel and Metselaar (1954) in Hollandia has shown that residual spraying offers great promise as a satisfactory method of control of rural malaria in New Guinea. A pilot project with the use of DDT as a residual spray has already been commenced in Netherlands New Guinea, and one is being planned for Papua-New Guinea.

SUMMARY.

1. *A. farauti* was found resting indoors in the daytime in a number of localities in Papua-New Guinea. These varied from sea level to an altitude of 5100 feet, on small islands, on the coast and coastal plain of the mainland, and from the Trobriand Islands in the eastern part of the Territory to the Western Highlands in the north-west.

2. Of *A. farauti* mosquitoes resting indoors in the daytime, 96% were engorged.

3. Indoor resting appeared to depend on a number of factors, including illumination and moisture.

4. The observed outdoor daytime resting sites of *A. farauti* are described.

5. Of *A. farauti* mosquitoes resting out of doors in the daytime, 76% were engorged.

6. By means of precipitin tests it was found that in one area the great majority of *A. farauti* mosquitoes resting indoors in the daytime had fed on man, whereas in another, one-half had fed on pigs and one-half on man. Of those resting out of doors in the daytime, one-half had fed on man and one-quarter on pigs.

7. Hydrachnid infestation of *A. farauti* is reported.

8. The breeding sites of *A. farauti* are described.

9. It is pointed out that there is great promise that residual insecticide spraying will be effective in malaria control in Papua-New Guinea.

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A SCHISTOSOME LARVA FROM THE MARINE SNAIL *PYRAZUS AUSTRALIS* AS A CAUSE OF CERCARIAL DERMATITIS IN MAN.

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COBT, in 1928, showed that a form of dermatitis known as "bather's itch" or "swimmer's itch" occurring in the freshwater lakes of North America was caused by a larval stage of a family of trematodes, the Schistosomatidæ. The particular larval stage is the final one that develops in the snail intermediate host; it is a cercaria, and because of a bifurcate tail, a fork-tailed cercaria. Members of this family when sexually mature live as parasites in the mesenteric blood vessels of many animals including cattle, rodents and birds.

Schistosome cercariæ have the ability to penetrate through animal skin, and this is an important feature of their existence, for it enables them to reach the blood vessels of their true host and so to attain sexual maturity. If they bore into the skin of some other animal, the cercariæ are stopped in the epidermis; their penetration and subsequent destruction give rise to the characteristic schistosome dermatitis.

Schistosome dermatitis in man was found to be widely distributed outside Australia, and lately Macfarlane has shown that it occurs in New Zealand (1944, 1949) and in Australia (1952). In New Zealand the affected spots are bathing places at the shallow ends of glacial lakes such as Wanaka and Wakatipu. The shallow waters support a growth of water weeds, and these in turn a population of the snails (species of Myxas and Lymnæa) which carry the fork-tailed cercariæ. Macfarlane named the cercaria *C. longicauda* and regarded the teal duck (*Fuligula novæzealandiæ*) as the likely carrier of the adult worm.

In Australia, T. H. Johnston (1941) drew attention to a dermatitis which was related to wading in backwaters of the Murray River at Tailem Bend. He also described

(1939) a fork-tailed cercaria from *Limnæa lessoni* collected in this area and named it *C. parocellata*; this name drew attention to a close morphological resemblance to *C. ocellata* which was already known to be responsible for dermatitis in Europe. The adult schistosomes were expected to be found in ducks or black swans. Macfarlane (1952) showed that *C. parocellata* would cause experimental dermatitis similar to that occurring naturally in billabongs and swamps along the Murray Valley. He also reported outbreaks of bather's itch from a series of lakes in an old watercourse at Wagin, Western Australia; but, although fork-tailed cercariæ were found in the water, and were tested on a susceptible person, they failed to produce any result.

A third area suspected by Macfarlane was Narrabeen Lake, a small shallow coastal lake near Sydney with occasional connexions with the Pacific Ocean. Nowadays after heavy rain the channel is often scooped out to prevent flooding of low-lying properties at the edge of the lake. The salinity of the lake water is near to that of the sea, and seems to be kept there by the balance between evaporation losses and rainwater additions, while the channel to the sea is closed. The snail population is similar to that of the estuaries of the adjoining coast, and does not include freshwater species. In 1931 (Bearup, unpublished report) and again in 1946-1947 (Macfarlane, 1952) cases resembling bather's itch were reported during the summer by persons wading or swimming in the lake. In 1931 one case was seen in a prawner; the rash was confined to the legs and to the depth to which he had been in the water.

The occurrence of schistosome dermatitis in sea water as well as in fresh water had not been suspected until the last few years. In 1952 Penner described an avian schistosome larva *C. littoralinæ* from the marine snail *Littorina planaxis* on the coast of California which produced swimmer's itch in susceptible persons. Similar infections have since been described from Florida, from Rhode Island and from Hawaii. One interesting sidelight is the occurrence of "clam digger's itch" in Narragansett Bay. The clams (*Venus mercenaria* and *Mya arenaria*) are recovered from boats floating in shallow water above the mudbanks; the "armer" lies flat on the boat and digs into the mud and sand to feel for the shells. Severe cases of dermatitis occur unless the arms and hands are protected by several pairs of nylon stockings and by rubber gloves. The full life cycle of this parasite, *Austrobilharzia variglandis*, is now known (Penner, 1953); the hosts include the red-breasted merganser (*Mergus serrator*) and the mud snail *Nassa obsoleta*.

The purpose of this paper is to describe a fork-tail cercaria from *Pyrazus australis* from Narrabeen Lake which has been shown to be capable of producing dermatitis in man.

Materials and Methods.

Snails have been collected from the lake at intervals of about two months during the past year. The results are shown in Table I for schistosome cercariæ only. *P. australis* is evidently a good intermediate host for trematodes, as cercariæ of eight different types have been recognized. Most of the foregoing examinations were made under a dissecting microscope after the snails had been crushed in water from the lake. *Pyrazus australis* are usually held for several days in glass tubes in lake water; they are examined daily, and those with fork-tail cercariæ are kept for further observation. In summer this is sufficient to detect the snails with mature schistosome or other cercariæ; but in winter the temperature must be raised to 25° C. for several hours before cercariæ will emerge. In any case the numbers of cercariæ emerging vary greatly, and there are usually intervals of several days of low yields between days of heavy production.

For detailed study cercariæ are examined alive in horse serum diluted to about half strength with the water in which they are collected. Intra-vitam stains such as neutral red, nile blue sulphate and methylene blue are of little use, but sometimes give additional information.

The cercariæ have powerful ventral suckers with which they adhere to any surface which they touch, and for this reason they are difficult to handle in pipettes. They quickly make for the surface film of the water and may be lifted from it by touching the surface with a coverslip or broken slide. This is a convenient method for applying them to the skin, as the glass may be inspected for cercariæ and then held to the skin with cellulose tape.

Cercaria variglandis Miller and Northup subspecies pyrazi, New Subspecies.

Cercaria variglandis Miller and Northup subspecies *pyrazi* (new subspecies) is a binoculate apharyngeal furcocercous cercaria with minute spines on the body, tail stem and furcæ (Figure I). Its measurements in microns, based on 25 larvæ recently killed in hot 5% formalin solution, are as follows (mean, standard error of mean, and range are given in that order): length of body, 235 ± 3·0 (203–270); breadth of body, 69 ± 1·0 (61·5–80); length of tail stem, 265 ± 4·9 (228–330); length of furcæ, 148 ± 3·4 (116–170). Definite constrictions separate the tail stem from the body and from the furcæ. No fins could be seen on the furcæ, tail stem or body. A thin epithelium covers the body and furcæ; around the tail stem it is thicker.

TABLE I.
List of Snails Examined

Name of Snail.	Number Examined.	Number with Forktailed Cercariæ.
Pyrazus australis Quoy and Gaimard ..	599	17
Pyrazus ebeninus Bruguiere	11	0
Bembicium keilmanseggi Zelebor	71	0
Austrocochlea porcata Adams	132	0
Parcanassa jonasi Dunker	248	0
Salinator fragilis Lamarck	233	0
Modiolus confusus Angas	10	0

The mouth opening is ventral, about 40μ from the anterior end, and passes into a simple œsophagus. The gut ends just behind the eyes with two short caeca. There is no pharynx. The ventral sucker is very protrusible; the midpoint is about 130μ from the anterior end; the mean diameter is 28μ.

The nervous system is represented by a broad band of tissue between the eyespots and extending laterally just beyond them. The eyes are cup-shaped and consist of many (about 60) small, discrete, brownish-black granules. They are on the dorsal surface, about 90μ from the anterior end.

The primitive gonads are a triangular group of cells posterior to the ventral sucker and near the ventral surface.

The excretory system has no definite bladder. Two main excretory ducts pass antero-laterally, and before reaching the acetabulum they divide to anterior and posterior collecting tubes. Three flame cells are connected to each tube to give a formula of 2[(3) + (2 + 1)]; their positions are shown in Figure I (*a*). Only one ciliated patch could be found; it was extremely difficult to see, as it lay below the fourth flame cell from the anterior end. In the tail the two main excretory ducts continue posteriorly around the island of Cort and then fuse. At the base of the tail the single duct redivides and single ducts continue to the tips of the furcæ.

Parts of the excretory system within and close to the borders of the penetration gland are difficult to see, because when the gland cells are slightly shrunken, the spaces on their borders simulate excretory ducts. The position of the junction of primary and secondary collecting tubules in the figure is regarded as correct because of the presence of the ciliated patch in that position.

The cercariæ develop in sporocysts (Figure I (*d*)) in the liver of the snail. Sporocysts were usually elongate oval, but sometimes had irregular constrictions which were probably due to pressure by other larvæ developing alongside them. Large numbers of sporocysts in different stages of development were the rule, even in snails which had been kept in captivity for six weeks. Over this period

the numbers of cercariæ escaping were growing less, but this did not seem to be from a lack of sporocyst material.

The sporocysts sometimes had only a few (two or three) fully developed cercariæ, but usually all stages were present, from germ balls to fork-tail cercariæ with eyespots.

At one end of the sporocyst an inturning of the wall suggested the presence of a birth pore, but this could not be verified in sectioned material. At this end the epidermis was several cells in depth; elsewhere it was only one cell deep with a thin cuticle over the whole body.

that the furcæ approach the body. At the same time the tail shortens and the numerous transverse wrinkles give it a shrivelled appearance (see Figure I (*b*)). In swimming the tail precedes the body; movement is effected by a rapid lateral vibration of the tail stem while the furcæ are held rigid and at right angles to the axis of body and tail stem. The tail is often separated from the body and apparently it is easily detached; both the body and tail are capable of independent movement, the body by creeping movements in which the head organ and acetabulum are used, and the tail by swimming.

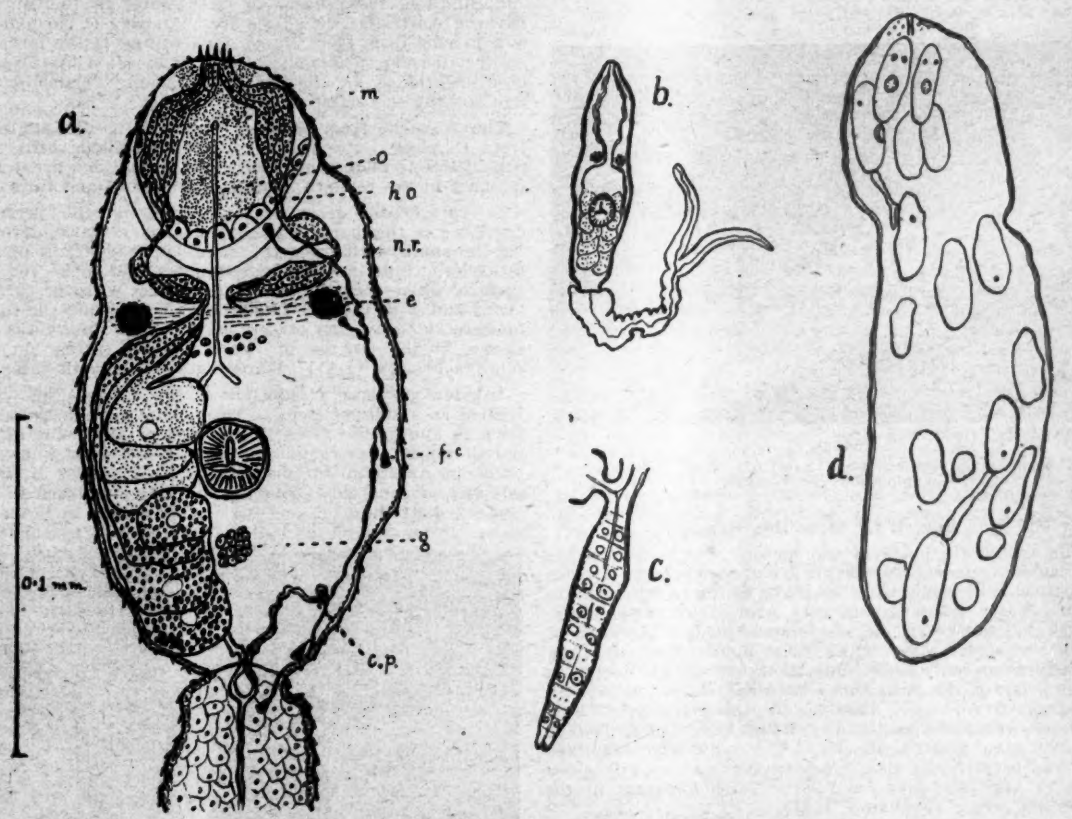

FIGURE I.

Cercaria variglandis subspecies *pyrazus*. (*a*) Body and part of tail (penetration glands omitted on right, excretory system on left). (*b*) Resting position at water surface (copied from photograph). (*c*) Furca and base of tail. (*d*) Sporocyst. Abbreviations as follows: c.p., ciliated patch; e., eyespots; f.c., flame cells; g., gonad; h.o., head organ; m., mouth; n.r., nerve ring; o., œsophagus. Camera lucida outlines of living specimens, (*a*), (*c*) and (*d*).

The host is *Pyrazus australis* Quoy and Gaimard.

The locality where the cercaria was found is Narrabeen Lake, near Sydney, New South Wales.

About 3% (17 in 599) of *Pyrazus australis* collected from Narrabeen Lake during the past twelve months have been infected with this cercaria. Infections have been present at about this rate throughout the year, although the emission rate of cercariæ is lowered almost to zero in Sydney winter temperatures.

Cercarial emergence can be stimulated by bringing the snails from dark into bright daylight, by wetting after drying them for a day, and especially by raising the temperature of the water to 25° C., or, better still, 30° C. In summer at room temperature the cercariæ emerge in greater numbers around midday. The cercariæ are active swimmers, and most of them quickly make for the water surface, where they remain in a characteristic position, parallel with the surface with the tail bent laterally so

Production of Dermatitis.

Cercariæ obtained by crushing the snails seemed to be fully developed, but did not produce any symptoms when applied to the skin. They were tried three times on Subject A and once on Subject C.

After the above trials, cercariæ that had emerged naturally were used on four subjects; Subject C again gave negative results, as did Subject D (three trials); Subjects A and B gave positive results and developed a typical rash (Figure II). The cercariæ were applied to the inner aspect of the forearm by the method described. The first symptoms commenced about fifteen minutes after the application, and felt like light pinpricks in several places under the glass slide. This irritation lasted for about one hour and then disappeared. The slide was removed at this time, and several small reddish macules were then visible on the experimental site. Itching was noticed again four hours later, but this lasted for an hour

or two and disappeared as before. Definite papules were slow to appear for the first (primary) infections in both cases and were not noticed until seven days after application of the larvæ. In one case a second application of larvæ resulted in papules on the second day. The papules were one to two millimetres in diameter and were surrounded by an area of erythema, but the itching was intermittent and never severe. It could be stimulated by rubbing or scratching or by the friction of clothing over the experimental site. The rash gradually faded, but remained for about a fortnight as brown areas of discoloration on the skin.

FIGURE II.
Experimental dermatitis of arm on ninth day after application of cercariæ.

Search for Definitive Host.

The vertebrate hosts of the mature worms responsible for causing cercarial dermatitis are always present in close ecological association with the snails acting as intermediate hosts. Water buffaloes, field mice, wild and domestic ducks, gulls and terns are already known to be the hosts of species of schistosomes which cause human dermatitis. In Australia no schistosome infections are known except in birds. The silver gull, *Larus novæ-hollandiæ*, has *Austrobilharzia terrigalensis* Johnston in the mesenteric veins, and in a recent inspection of gulls on Lake Tuggerah four of five gave positive results. The only tern examined (*Sterna bergii*) was also infected. Black swans (*Chenopis atrata*) visit the lakes and have *Trichobilharzia* in the intestinal veins (Johnston, 1941).

In this laboratory animals failed to become infected when tried by the following three methods: (*a*) by immersing the feet in water containing cercariæ for thirty minutes; (*b*) by pipetting cercariæ on to plucked or shaved areas of skin; (*c*) by pipetting cercariæ direct into the mouth. The experimental animals used were: three domesticated ducks, three domesticated pigeons (*Columba livia*), one sparrow (*Passer domesticus*), and three laboratory mice. Young gulls have not been available.[1]

Discussion.

The list of snails given in Table I is not by any means complete for species recorded from Narrabeen Lake, but it includes all the common ones. *Pyrazus australis*, *Salinator fragilis* and *Parcanassa jonasi* are probably in the greatest numbers and are found on sandflats where aquatic birds congregate. At low water these flats are partly dry, a series of shallow pools being left in which the snails concentrate as the water recedes. The warmth of the sun quickly raises the temperature of these small pools, and this in turn would stimulate the emergence of cercariæ.

The cercaria described in this paper, an apharyngeate, ocellate, brevifurcate cercaria with five flame cells on each side of the body and one in the tail, resembles several already described. Important morphological characters of some closely related cercariæ are given in a table for comparison (Table II), and include the two ocellate schistosome cercariæ already described from Australia. *C. jaenschi* from *Ameria pyramidata* (Johnston and Cleland, 1937) and *C. parocellata* from *Limnæa lessoni* (Johnston and Simpson, 1939) occur in fresh water in the Murray River of Australia; the adults are unknown. *C. variglandis* is a marine form from *Nassa obsoleta* and is the larva of *Austrobilharzia variglandis* of aquatic birds; it has already been mentioned as the organism causing "clam-digger's itch" on the east coast of North America.

The cercaria from *Pyrazus australis* is distinguished from *C. parocellata* by the numbers of flame cells and penetration glands, and from *C. jaenschi* by great differences in the relative lengths of body, tail and furcæ.

C. variglandis resembles very closely the cercaria described in this paper. Both are marine cercariæ developing in snails living on the sand and mud flats of the estuaries. Both are active swimmers and make for the surface, where they lie flat in full contact with the surface layer, and with the tail flexed laterally to bring the furcæ forward to the region of the body. Slight differences are shown in the lengths of tail stem and furcæ, but the relative lengths (1·8:1·0) are the same in both cases.

In view of these circumstances the cercaria has been treated as a subspecies of *C. variglandis*. When the adult form is known the cercaria will assume the name of the parent worm. *Austrobilharzia variglandis* is not known to occur in Australia, although the related species *A. terrigalensis* is apparently common in gulls and terns in the Sydney district.

FIGURE III.
Natural infection, from paddling in Narrabeen Lake, three and a half days after exposure.

The distribution of bather's itch in marine waters in Australia is unknown. The range of *Pyrazus australis* is said to be from the northern to the southern borders of New South Wales in estuaries and salt-water lagoons, and probably on coastal sandflats wherever they are sheltered from wave action. Large-scale examinations of *P. australis* have been made only from Narrabeen Lagoon, where about 3% contain schistosome cercariæ.

During the summer of 1954-1955 I saw several cases of severe dermatitis that had developed within a few hours of the subject's wading in Narrabeen Lagoon.[1] The condition is well known to persons who live near the water and to those who visit it often for fishing or prawning or bathing; they know it as "weed itch" and associate it with wading in or near beds of the ribbon weed, *Zostera*. How-

[1] Adult worms have since been developed in budgerigars (*Melopsittacus*), in young silver gulls and in young pigeons; they belong to the genus *Austrobilharzia* and are probably *A. terrigalensis* Johnston, 1917. Morphological studies are still proceeding.

The genus *Austrobilharzia* and related genera are now undergoing revision by Penner (personal communication, 1955).

[1] Mr. A. M. Browne, of North Narrabeen Pharmacy, kindly drew my attention to cases that were occurring in his locality.

ever, the *Zostera* beds are rooted in shallow sandflats which are also heavily populated with *Pyrazus australis*.

Reports from Lake Tuggerah[1] indicate that dermatitis similar to schistosome dermatitis is common in the summer months, and after a spell of hot weather, when the water is warm, infestations occur by night as well as by day. In many cases the condition is acquired in the channel connecting the lake and the sea (The Entrance); this is a favoured fishing site for rod fishermen, who cast into the channel from shallow water up to the knees, and the rash is confined to these parts. Usually the rash is first noticed twenty-four hours later as minute red points, and these increase in size to papules several millimetres in diameter in the next few days, and become very itchy. After a week the rash begins to subside unless it is secondarily infected by scratching or rubbing off the tops of the papules. The dermatitis is known locally as "pelican itch", and pelicans are common in backwaters off the channel. Extensive sandflats at the lake end of the channel carry a dense population of *Pyrazus australis*, together with *Parcanassa* and *Austrocochlea*.

TABLE II.

Comparison of Cercaria from Pyrazus Australis with Closely Related Species.

Dimensions. (Microns.)	*C. v. pyrazi.*	*C. variglandis.*	*C. jaenschi.*	*C. parocellata.*
Body length ..	235	237	146	282
Body width ..	69	72·5	77	65
Tail length ..	261	228	416	235
Furcal length ..	146	126	116	127
Flame cells ..	12	12	12	14
Penetration glands	6	6	5	5

Observations on the pathological and immunological reactions of human skin to cercarial penetration have been summarized by Cort (1950); this paper is a useful review of all work to date on schistosome dermatitis. The penetration of the cercariæ into the skin produces a prickling sensation which usually subsides within an hour, and macules one to two millimetres in diameter appear at the sites of penetration. The macules are replaced by papules about twelve hours later; usually at this time intense itching begins to develop, but except in severe cases it is intermittent and disappears within a few days. The papules are surrounded by erythema and œdema, which can be aggravated by scratching or rubbing. After two or three days vesicles replace the papules, and if their tops are rubbed off, further trouble may occur from secondary invasion by bacteria. If not, the vesicles fade, and after a week only small pigmented spots remain.

The reactions described above seldom appear in initial infections, which are usually mild and often pass unnoticed. The itching and erythema are mild or absent, and the development of papules is delayed until the fifth to the twelfth day. Typical schistosome dermatitis, as seen under natural conditions, resembles that produced in the laboratory by repeated exposures to cercariæ. The papules are large and indurated and are usually accompanied by erythema and œdema with considerable pruritus and vesicle formation.

Macfarlane (1949) and Olivier (1949) conclude from their studies on repeated infections that the dermatitis is a sensitization phenomenon. The prickling sensation and the development of macules are due to the movements of the cercaria during penetration, and to the lytic effect of the exudate from the penetration glands. The papules of sensitized subjects are associated with a vigorous antigen-antibody reaction stimulated by the liberation of antibodies when the cercaria dies. A histamine-type itch occurs at this stage; it can be increased by scratching or rubbing.

[1] I am indebted to Mr. Hilton Chalmers, of The Entrance, Tuggerah Lakes, for this information. He is intereated in marine biology, and as he is in business as a pharmacist he is in a position to gather information of the epidemiology of bather's itch in the area.

The symptoms in the two positive reactions recorded here agree with those of primary or mild secondary infections. Itching and erythema were not severe, there was no œdema, and papules did not appear until several days after exposure. The two persons who gave no reaction are regarded as insensitive or perhaps resistant to the cercarial antigens. Under natural conditions of exposure to infections in the field some persons fail to develop dermatitis, while others are susceptible to varying degrees. Susceptible persons usually show increased sensitivity with repeated exposures to infection.

Measures to control infection in fresh water by the destruction of snail hosts with copper salts are described by Cort (1950). Cercarial repellents applied to the skin have also been used with success (Hunter *et alii*, 1952). Copper oleate dissolved in alcohol-ether, and dimethylphthalate or dibutylphthalate used in pure form, gave protection in that order and were still effective after eight hours' immersion. A brisk rub with a towel immediately after one leaves the water will rub off many cercariæ which would otherwise enter the skin.

Summary.

A schistosome cercaria from the marine snail *Pyrazus australis* has been shown to cause cercarial dermatitis in man. The cercaria is present in about 3% of these snails from Narrabeen Lake. The dermatitis follows a course similar to that already described for cercarial dermatitis due to non-human schistosomes in North America and elsewhere.

The morphology, habitat and general behaviour of the cercaria resemble closely those of *C. variglandis* (Miller and Northup), and the cercaria has been provisionally named as a subspecies *pyrazi*.

Adult worms have been recovered from experimental infections in silver gulls, pigeons and budgerigars; they closely resemble *Austrobilharzia terrigalensis* Johnston, 1917 (see footnote).

Acknowledgements.

Joyce Allen and T. Iredale, of the Australian Museum, identified snails for me, and G. Merritt, of the McMaster Laboratory, prepared sections of cercariæ. Members of the staff of this school who cooperated were Dr. T. C. Backhouse, J. Cerbucks, V. Golding, L. Gray, V. Klavins, L. Morton and K. O'Gower. I wish to acknowledge with thanks the assistance of all these helpers. The paper is published with the permission of the Director-General of Health, Canberra.

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DIABETIC DIETS SIMPLIFIED: THE CORE DIET.

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THE modern trend in diabetic diets is towards simplification. The free diabetic diets can be regarded as the simplest type of modification because, in spite of the name, most of these diet schemes restrict or discourage the use of sugar. Lawrence's line-ration scheme has long been in use (Lawrence, 1952). This classifies food into two groups. The first group contains carbohydrate foods with each portion having 10 grammes of carbohydrate. The second group contains protein and fat foods with each portion having 7·5 grammes of protein and 9·0 grammes of fat. More recently, in the United States, a joint committee from the American Dietetic Association and the Diabetes Branch of the United States Public Health Service published their report on diabetic diet calculations (Caso, 1950). A series of six diets were chosen by the committee and foods were divided into six basic food groups. The diets to be presented in this paper are an extension of Lawrence's scheme, but a simplification of the American system. Instead of six different types of diets, two core diets of 1800 Calories and 2400 Calories are given (Diets I and II) and also a Substitution Sheet. The food composition figures used are based on "Tables of Composition of Australian Foods" (Osmond, 1948) from the Commonwealth Health Department, and "Diet Hints for Diabetics" (1954). Simple methods of increasing or decreasing the Calories are presented. The figures are rounded off, so the values stated are approximate, but are still within the order of accuracy which can be expected if due account is taken of variation in food value analyses.

Diet I.

1800 Calorie Core Diet.

Two cups of milk to be used through the day.

Breakfast.

Porridge or ready-to-eat cereal	½ cup
Eggs	2
Toast	1 thick slice, 2 oz.
Butter	3 level teaspoons

Light Meal.

Cooked meat, fish or cheese	Medium serving, 2 oz.
Free vegetables	As desired
Fruit	1 piece
Bread	4 thin slices, 4 oz.
Butter	5 level teaspoons

Hot Meal.

Cooked meat or fish	Large serving, 3 oz.
Potato	2 tablespoons
Starchy vegetables	1 serving
Free vegetables	As desired
Fruit	1 piece

Food Information.

Egg: One is equal to a small serving of meat, fish or cheese.

Meats: Stewed meats may be used if gravy is limited to 1 tablespoon. One tablespoon per day of gravy and white sauce is allowed. If weighing the meat, the bones and excess fat should not be counted.

Fruit: Fresh, stewed or tinned, providing no sugar is used. Limit grapes and cherries to 10-14. Small bananas.

Bread: 1 slice may be exchanged for 2 saos, 4 "Vita-Weat", 3 thin captains, 2 small scones, 1 small bread roll, or ½ cup cooked cereal—porridge, rice, spaghetti, macaroni.

Free Foods which can be Used as Desired.

Water	Asparagus
Tea	Beans (French)
Coffee	Broccoli
Soda water	Cabbage
"Bonox"	Cauliflower
"Bovril"	Celery
"Marmite"	Chokoes
"Vegemite"	Cucumber
Fish paste	Lettuce
Clear broth (all fat removed)	Marrow
Saccharine (add after cooking)	Mushrooms
Spices	Onions
Herbs	Peppers
Essences	Radishes
Flavourings	Silver Beet
Junket tablets	Squash, summer
Gelatine	Spinach
Worcestershire sauce	Tomatoes
Mint	White turnip
Parsley	Watercress
Mustard	Lemon juice
Vinegar	Rhubarb

Food Not to be Used.

Sugar	Lollies
Jam	Chocolates
Marmalade	Ice cream
Honey	Alcoholic drinks
Syrup	Soft drinks
Cakes	Cordials
Pastries	Dried fruit
Puddings	Dried vegetables
Sweet biscuits	Salad dressings
Flour	Mayonnaise
Cornflour	Thickened soups
Arrowroot	

Food Value.

Calories	1800
Protein	75 grammes
Carbohydrate	175 grammes
Fat	90 grammes

Diet II.

2400 Calorie Core Diet.

Two cups of milk to be used through the day.

Breakfast.

Porridge or ready-to-eat cereal	½ cup
Eggs	2
Toast	1½ thick slices, 3 oz.
Butter	4 level teaspoons
Fruit	1 piece

Light Meal.

Cooked meat, fish or cheese	Large serving, 3 oz.
Free vegetables	As desired
Fruit	2 pieces
Bread	4 thin slices, 4 oz.
Butter	6 level teaspoons

Hot Meal.

Cooked meat or fish	Large serving, 4 oz.
Potato	2 tablespoons
Starchy vegetables	1 serving
Free vegetables	As desired
Fruit	1 piece
Bread	2 thin slices, 2 oz.
Butter	2 level teaspoons

Food Information.

Egg: One is equal to a small serving of meat, fish or cheese.

Meats: Stewed meats may be used if gravy is limited to 1 tablespoon. One tablespoon per day of gravy and white sauce is allowed. If weighing the meat, the bones and excess fat should not be counted.

Fruit: Fresh, stewed or tinned, providing no sugar is used. Limit grapes and cherries to 10-14. Small bananas.

Bread: 1 slice may be exchanged for 2 saos, 4 "Vita-Weat", 3 thin captains, 2 small scones, 1 small bread roll, or ½ cup cooked cereal—porridge, rice, spaghetti, macaroni.

Free Foods which can be Used as Desired.

Water	Asparagus
Tea	Beans (French)
Coffee	Broccoli
Soda water	Cabbage
"Bonox"	Cauliflower
"Bovril"	Celery
"Marmite"	Chokoes
"Vegemite"	Cucumber
Fish paste	Lettuce

Free Foods which can be Used as Desired.

Clear broth (all fat removed)	Marrow
Saccharine (add after cooking)	Mushrooms
Spices	Onions
Herbs	Peppers
Essences	Radishes
Flavourings	Silver beet
Junket tablets	Squash, summer
Gelatine	Spinach
Worcestershire sauce	Tomatoes
Mint	White turnip
Parsley	Watercress
Mustard	Lemon juice
Vinegar	Rhubarb

Food Not to be Used.

Sugar	Lollies
Jam	Chocolates
Marmalade	Ice cream
Honey	Alcoholic drinks
Syrup	Soft drinks
Cakes	Cordials
Pastries	Dried fruit
Puddings	Dried vegetables
Sweet biscuits	Salad dressings
Flour	Mayonnaise
Cornflour	Thickened soups
Arrowroot	

Food Value.

Calories	2400
Protein	90 grammes
Carbohydrate	245 grammes
Fat	115 grammes

Substitution Sheet.

Fruit Portions.

Apples	1 small
Apricots	2 medium
Bananas	1 small
Blackberries	½ cup
Cherries	14
Grapefruit	½ medium
Grapes	12
Mandarins	1 large
Mulberries	½ cup
Nectarines	2 small
Oranges	1 medium
Orange juice	½ cup
Passionfruit	2 large
Pawpaw	½ cup
Pawpaw, slices	1 small
Peaches	1 medium
Pears	1 small
Persimmons	1 small
Pineapple	1 thin slice
Pineapple juice	½ cup
Plums	1 large
Rockmelon pulp	1 cup
Strawberries	¾ cup
Watermelon	1 cup

(Calories 40, carbohydrate 10 grammes.)

Starchy Vegetable Portions.

Beetroot	½ cup
Brussels sprouts	½ cup
Carrots	½ cup
Fresh corn	½ cup
Parsnips	½ cup
Peas	½ cup
Pumpkin	½ cup
Squash, Hubbard	½ cup
Swedes	½ cup
Potato	¼ cup

(Calories 48, carbohydrate 10 grammes, protein 2 grammes.)

Bread.

One slice of bread (½ inch thick) from a sandwich loaf (1 oz. in weight) is equal to any one of the following:

- ½ cup of cooked cereal—porridge, rice, vermicelli, macaroni, sago, tapioca or spaghetti.
- ¾ cup of ready-to-eat cereal.
- 1½ "Weet Bix".
- 2 milk arrowroot biscuits.
- 2 coffee biscuits.
- 2 sao biscuits.
- 3 thin captain biscuits.
- 4 "Vita-Weat" biscuits.
- 2 wheatmeal biscuits.
- ½ cup of potato.
- 1½ portions of fruit.
- 1½ portions of starchy vegetable.

(Calories 72, carbohydrate 16 grammes, protein 2 grammes.)

Meat.

One ounce of cooked meat—beef, mutton, lamb or lean pork—is equal to any one of the following:

- 1 oz. sardines or tinned herrings.
- 1 egg.
- 1 oz. cheese.
- 2 level tablespoons of peanut butter.
- 1 oz. rabbit, poultry, veal, tripe, liver, kidney or fish (including oysters, prawns, and tinned fish cutlets), with one extra teaspoon of butter.

(Calories 85, protein 6 grammes, fat 7 grammes.)

Butter.

One level teaspoon of butter or margarine is equal to any one of the following:

- 1 four-inch-long rasher of crisp cooked bacon.
- 2 teaspoons of cream.
- 1 teaspoon of oil or cooking fat.
- 5 small nuts.
- 4 teaspoons of coconut.

(Calories 24, fat 3 grammes.)

Principles on which the Simplified Diabetic Diets are Based.

Each patient is considered as an individual, and there should be no rigidity in the application of the following principles.

The diets are specified in Calories.

Protein.

The protein content is as high as practicable. The patient's food habits and economic status will govern this to some extent.

Fat.

The fat content is as low as practicable. The palatability of the diet and the protein content will affect the total fat intake.

Carbohydrate.

No specific division of carbohydrate between breakfast, light meal and hot meal is made. The highest carbohydrate intake usually occurs at the light meal, in which bread is allowed for a cut lunch. In the case of shift workers this meal may be taken any time during the day or night, and this will vary from week to week. The carbohydrate from the milk which is allowed on the diet may be taken as desired at any time during the day or evening. On the high milk content diet (see below, Example II), it is unlikely that the milk will be taken all at once. If a supper is needed or extra carbohydrate required at any time during the day or night, this can be treated as an extra or may be deducted from the carbohydrate already in the diet.

Interchangeability of Protein, Fat and Carbohydrate.

In the absence of evidence to the contrary, it is assumed that for a person eating a general mixed Australian diet protein and fat are not interchangeable with carbohydrate, and no account is taken of their glycogenic potential. The amounts of protein and fat foods are not kept within rigid limits. The patients are taught that these should be consumed in the quantities stated in the diet, in order to satisfy the appetite with these foods rather than with the cheaper and easily available carbohydrate.

Weighed or Portion Diets.

Diets I and II show both portions and weights for bread and meat. The importance of limiting bread intake is stressed to the patients, and a model in the form of a block of wood four inches square and one-quarter of an inch thick is given to each patient to demonstrate the size of a one-ounce slice of bread. The purchase of diabetic scales is not considered essential. The meat is stated in servings and ounces; the weight is given to emphasize the quantity recommended—not, as in the case of bread, lest the patient should eat more than the quantity allowed.

Fruit and Vegetables.

A free list of vegetables is used. This assumes a content of five grammes of carbohydrate in a large serving of any of the free vegetables, which is well within the limits of accuracy. Fruit and starchy vegetables are listed in portions of 10 grammes of carbohydrate and, in the case of vegetables, two grammes of protein. These portions

TABLE I.
Basic Figures for Carbohydrate, Protein, Fat and Calories.

Food.	Portions.	Ounces.	Carbohydrate.	Protein.	Fat.	Calories.
Milk	1 cup.	8	10	7	9	150
Starchy vegetables	1 portion.	—	10	2	—	48
Fruit	1 portion.	—	10	—	—	40
Bread	1 (¼ inch) slice.	1	16	2	—	72
Meat or substitute	1	1	—	6	7	85
Butter or substitute	8 level teaspoons.	1	—	—	24	210
Bread	1 (¼ inch) slice.	1	16	2	3	100
Butter	1 level teaspoon.	⅛	—	—		

yield 40 Calories per portion of fruit and 48 Calories per serving of vegetable. The starchy vegetables are stated in quarter, third or half cup portions on the substitution sheet.

Substitutions.

On the substitution sheet an extra teaspoon of butter is allowed for each ounce of fatless meat. Bacon is treated as a fat substitute. Potato is listed as a bread substitute and a starchy vegetable substitute.

Diet Details.

The "core" diet is the 1800 Calories diet (Diet I). This provides approximately 175 grammes of carbohydrate, 75 grammes of protein and 90 grammes of fat. By the use of the simplified Table I the 1800 Calorie diet (Table II) can easily be modified to suit the needs of most patients. The simplest method of increasing or decreasing the Calories is to use the figures for a slice of bread (one ounce) *plus* a teaspoon of butter, which can count as 100 Calories and 16 grammes of carbohydrate. A 2400 Calorie diet (Diet II) for the physically active man is discussed in Example III.

TABLE II.
1800 Calorie Diet.

Food.	Portions.	Ounces.	Carbohydrate.	Protein.	Fat.	Calories.
Milk	2	16	20	14	18	300
Starchy vegetables	2	—	20	4	—	96
Fruit	2	—	20	—	—	80
Bread	7	7	112	14	—	504
Butter or substitute.	8 teaspoons	1	—	—	24	210
Meat or substitute	7	7	—	42	49	595
			172	74	91	1785
			5[1]			
			177			
Rounded off to			175	75	90	1800

[1] Extra carbohydrate from free vegetables.

Modifications of the 1800 Calorie Core Diet.

Example I: Reduction Diet.

It will be noted that the 1800 Calorie diet contains seven slices or seven ounces of bread or bread substitute. If a reduction diet is needed for an elderly patient who is not physically active, a 1500 Calorie diet is obtained by subtracting three slices of bread and butter (100 Calories each) from the 1800 Calorie diet.

Example II: Diet of High Milk Content for Children or Pregnant Women.

If a diet of high milk content is required for children or for pregnant women, two cups of milk can be added, giving an extra 300 Calories and 20 grammes of carbohydrate. It should be distributed throughout the day and not consumed at one meal. This diet would then provide 2100 Calories.

Example III: Diet for Physically Active Men.

If a higher Calorie diet is needed, a second core diet of 2400 Calories is shown in Diet II. In these cases the servings of protein and fat foods are increased as well as the carbohydrate content.

Summary.

1. Core diabetic diets of 1800 and 2400 Calories have been discussed.

2. A simplified food value table is given to allow increases and decreases by 100 Calorie steps, a slice of bread (one ounce) and butter (one teaspoon) being used to provide the 100 Calories and the 16 grammes of carbohydrate.

3. An addition of 150 Calories and 10 grammes of carbohydrate is provided by one cup (eight ounces) of milk if a diet of high milk content is needed for children or pregnant women.

4. A Substitution Sheet is given to be used in conjunction with the diet sheet.

Acknowledgement.

It is a pleasure to acknowledge our indebtedness to Dr. John Leah, honorary physician in charge of the Diabetic Clinic at the Royal Newcastle Hospital, for his leadership and encouragement in simplifying the diabetic diets.

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Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Advances in Pediatrics", edited by S. Z. Levine, with associate editors, John A. Anderson, Margaret Dann, A. Ashley Weech, Myron E. Wegman and Warren E. Wheeler; 1955. Chicago: The Year Book Publishers, Incorporated. Volume VII. 9" x 6", pp. 352, with 69 illustrations. Price: $8.00.

Contains seven monographs on various subjects.

"Practical Management of Disorders of the Liver, Pancreas and Biliary Tract", by John Russell Twiss, M.D., F.A.C.P., and Elliot Oppenheim, M.D., F.A.C.P.; 1955. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson, Limited. 9¼" x 6¼", pp. 654, with 143 illustrations, three in colour. Price: £8 1s. 3d.

In addition to the two authors named there are eight contributors; the book is based on personal experience in private and hospital practice.

The Medical Journal of Australia

SATURDAY, JUNE 25, 1955.

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ROTA SYSTEMS IN GENERAL MEDICAL PRACTICE.

In the course of a discussion in these columns on general medical practice in the issue of September 25, 1954, reference was made to three documents. The first was a report by S. J. Hadfield in the *British Medical Journal* of September 26, 1953; the second was a report of the Committee on General Practice within the National Health Service, published by the Central Health Services Council of Great Britain; the third was a book entitled "General Medical Practice: A Report of a Survey", by Dr. Stephen Taylor. These documents dealt with general medical practice in Great Britain, but there was a great deal that was applicable to general practice in Australia. One of the subjects dealt with at some length in Taylor's book was that of rota systems. This was briefly mentioned in our discussion and further reference to it was promised for some future occasion. Taylor thought that the rota system might be regarded as the half-way house on the road to group practice. He described the rota system as a form of worker cooperation with no financial link between the doctors taking part and no medical specialization. Taylor explained that the rota system was an ingenious device by which the general practitioner was able to give his patients a twenty-four-hour, three-hundred-and-sixty-five-day service, while enjoying reasonable time off duty. The basis of the system is an arrangement whereby a group of general practitioners, previously working in isolation, come together and make arrangements so that each in turn takes over the emergency duties of all in the group without any financial link between the practices. This sort of arrangement has been mentioned from time to time in these columns, though the term rota system has not been used. The advantages of such an arrangement need not be emphasized. The patients of all the doctors concerned are guaranteed that at least one doctor will always be available for emergencies. The practitioners, on the other hand, can enjoy regular periods off duty by day and by night when they know that they will not be disturbed. Taylor points out that as a result of this arrangement practitioners are no longer continuously tired out, they can give their patients better service, and they have enough energy left to keep up to date in their work and to lead an ordinary family life. The rota, he declares, breaks the vicious circle of isolation, fatigue and inefficiency. There are, of course, disadvantages, and these must not be overlooked. The main disadvantage is that in an emergency the patient must accept the services of the doctor on duty who may or may not be his own doctor. In reply to this it will, of course, be stated that in the absence of any rota system, the patient in an emergency may have to accept the services of any doctor who is available. But before the advantages and disadvantages are discussed any further it may be well to follow Taylor in some of his statements.

In eight of thirty practices visited by Taylor, true rota schemes were in operation. In twelve of the remaining twenty-two there were rota schemes working inside partnerships. He thus concludes that rota arrangements are now the rule rather than the exception in good general practice. Four of the eight rota schemes were in industrial areas; two were in urban residential areas and two were in country towns. The largest number of doctors in a single rota scheme was 65, but this is a special instance and merits special discussion. Apart from this one instance, the numbers in the rotas were 10, 8, 7, 7, 6, 4 and 4. The usual times covered were week-ends, holidays and half-days; less commonly, night work was covered. Considerable variation was found in the rotas running inside partnerships. With a small number of partners the amount of time which each could have off duty was considerably less than in a typical industrial area rota. Even when there were enough partners to give adequate off-duty periods, this situation was often not fully exploited; in particular, there tended to be over-staffing at week-ends. As an example of over-staffing, Taylor refers to one partnership of four in which only one doctor was off duty for each week-end. In this practice, the average number of Sunday visits per doctor was about six, and Taylor points out that a single doctor on duty could easily have dealt with the 18 or 20 visits so as to give his three colleagues a free week-end. The doctors in this instance maintained that the type of patient in the area would resent not being able to have attention from the doctor of his choice. In similar areas, however, it was found that when rotas had been introduced inside groups, no loss of patients occurred. In one group practice with seven partners and one assistant, each doctor had one off duty day per week. In another group practice of three partners with a trainee assistant, two doctors were off duty each week-end. Taylor refers to an investigation carried out in 1952 by the Medical Practitioners Union, which sent a *questionnaire* to every practitioner in the National Health Service. The *questionnaire* dealt with various aspects of teamwork in general practice and

included some questions about rot schemes. Replies were received from about 2000 doctors, or just under 10%. In industrial areas it was found that 65% of general practitioners were members of some kind of rota scheme; about half of these schemes had five or more members. In urban residential areas 60% of general practitioners were members of a rota system, but only a third of these rotas had five or more members. In rural areas, including some small country towns, 50% of general practitioners were members of some kind of rota, but only one-tenth of the rotas had five or more members and nearly half were rotas of only two members. An analysis covering all the areas showed that of doctors working singlehanded, 52% belonged to rota schemes. In discussing the optimum size of a rota, Taylor defines the optimum size as one in which the individual members will not have more than one full night on duty per week apart from week-ends. He concludes that, broadly speaking, satisfactory minimum and maximum figures for rotas are five and twelve, with an optimum of perhaps seven. Taylor sets out the following key rules for any rota, apart from the obvious ones about the times of starting and finishing duty:

1. The doctor on duty must ensure that his contact point, whether it is his home, his surgery, or his telephone, is properly manned throughout the entire duty period.

2. All doctors must make sure that their patients know how to get in touch with the doctor on duty, or at least that they can find out easily.

3. Doctors who meet patients of other doctors in the course of their rota duties must not accept these patients on their lists.[1]

Taylor thinks that the last of these rules results in a diminution of the patient's free choice of doctor. At the same time, he adds, there can be no alternative if the rota is to survive. Taylor makes special reference to the Borough of Ilford, which has a population of 185,000; it is in the County of Essex, but is continuous with East London. In Ilford there are 66 general practitioners and 65 of them are members of a rota scheme. Thus Ilford represents the rota system in almost pure form. The doctors are divided into seven groups on a geographical basis, the numbers in the groups being 12, 12, 10, 10, 8, 8 and 5. At Ilford, a special officer called the rota clerk or rota agent is employed, and it is his duty to take all incoming telephone calls for the doctors at the times when the rota system is operating and to pass these calls on immediately to the duty doctors.

Taylor tried to discover whether the rota system was acceptable to the general public. An investigation was made in the Borough of Ilford, and the results are set out in some detail in an appendix to the book. In a summary of the findings, he states that the answer to the key question, whether the people of Ilford were prepared to accept the rota system in theory and in practice, was an emphatic "yes". Among the public as a whole, 85% thought the rota was a good idea; among those who had used the rota 87% thought it was a good idea. There remained a dissatisfied 10%. More than half of these critics disliked, not the principle, but the details of the working scheme. They did not realize why, under the Ilford scheme, the rota clerk had to ask a number of questions. Some of the comments, for example, about the rudeness of one doctor, the complication of the scheme and the need for publicity and explanation, were regarded as pointers for action rather than as criticisms of the rota idea. The diehard individualists, the ultimate 2%, who demanded their doctor when they wanted him, appeared "to be motivated in part by their dislike of doctors". More than half (and possibly more than three-quarters) of the non-rota users in Ilford were aware of the rota scheme; the principal sources of knowledge were notices and information given at doctors' surgeries and notices in the local Press. Taylor's conclusion is that no doctor need feel perturbed about entering a rota scheme provided it is efficiently conducted and fully explained to the public.

Careful consideration of the rota system, the features of which have been described by Stephen Taylor, show that it is one method by which general practitioners can secure reasonable leisure and have that leisure arranged at planned intervals of time. At the outset of this discussion some advantages and disadvantages of the system were stated. The general statement may be made that, whether he belongs to a regular planned system or not, a general practitioner who proposes to be absent from his practice at evenings or at week-ends, for example, must make some arrangement by which patients who regard themselves as his patients may be able to receive attention should they require it. In the issue of November 6, 1954, a leading article entitled "Good Doctoring" appeared. The whole question of planned leisure and freedom from duty for general practitioners must be dealt with in the light of the considerations stated in that leading article. In other words, the practitioner has to recognize his responsibilities to the community which he serves. If a rota system is established, it must be properly conducted; failure to secure adequate control must result in a loss of prestige by the medical profession as a whole and in a lowering of the general standard of medical care. Even members of a rota system will recognize that they must not be slaves to it, that times will arise when certain patients who are desperately ill and whom they are attending should not be handed over to the temporary care of another practitioner who is not familiar with the urgent requirements of the patient's illness. The profession as a whole must recognize the fact that such arrangements as group practices and the functioning of rota systems are more than likely to undermine the security of the doctor-patient relationship. Planned leisure for doctors, and especially for general practitioners, there must be; but practitioners must keep constantly in mind that the patient must always be the first consideration and that the honour of the medical profession must be upheld.

[1] This, of course, refers to the National Health Service.

Current Comment.

THE URÆMIAS.

IT is only in comparatively recent years that the conception of uræmia as a group of conditions basically due to electrolyte imbalance, rather than a clinical entity caused by retained end products of nitrogen metabolism, has achieved general recognition. Osler accepted the name uræmia only reluctantly, because he considered not only that the ætiological factors were unknown but also that it represented a combination of types; however, he did accept

the fact that a high blood urea content could cause some at least of the symptoms. It is not surprising that the older theory should have persisted since the common features of all forms of uræmia—oliguria with urea retention and low blood urea clearance—tend to force the impression that it is the urea which is responsible. Even as late as 1950, Best and Taylor, while they stated in their well-known text-book on the physiological basis of medical practice that of the known nitrogenous wastes such as urea, uric acid or creatinine, none was toxic or could produce uræmia experimentally, nevertheless referred to toxic metabolic products in connexion with uræmia. At about this time, however, it was commonly accepted by many workers that the extent of the azotæmia which accompanied renal damage was a reliable index of the extent of that damage, but no more. Intestinal lavage aimed only at lowering the blood urea level, for instance, did only that, without relieving uræmia. But with the wider use of dialysis by means of the artificial kidney, it became obvious that electrolyte and fluid imbalance was the essential basic feature.

Recently, Professor G. M. Bull, in the Goulstonian Lectures for 1955,[1] has reviewed the progress in this field, showing how a better understanding of the pathogenesis of the uræmias might lead to better treatment. His paper is important and warrants detailed consideration. He defines the sequelæ of renal failure as the uræmias, those states which occur when the kidneys are unable to maintain a normal internal environment, and points out that they arise when there is an imbalance between the rates of intake, or of production in the body, of chemical substances, and their rates of secretion. It follows that there can be no single picture of uræmia, which is a group of allied conditions arising from electrolyte or fluid imbalance due to failure of the kidneys either to excrete substances present in harmful excess or to retain essential substances. However, the end products of nitrogen metabolism are not the harmful substances responsible for the uræmias. Bull classifies the uræmias broadly in the following way. (i) Acidæmia develops when the ratio of strong anion to fixed base rises, as when the intake of anion (particularly chloride, phosphate or sulphate) exceeds the capacity of the kidney to excrete it, or when fixed base is lost owing to a defect in renal base-sparing mechanisms. (Fixed base may also be lost in diarrhœic stools.) Clinically, there is deep, sighing respiration with clouding of consciousness progressing to coma; commonly also there are restlessness, headache and nausea, and occasionally meningism; tetany does not occur. The available plasma carbonate is reduced (in respiratory alkalæmia from hyperventilation it is similarly reduced, but the pH of the plasma is raised, and tetany can occur). Treatment is with sodium bicarbonate given by mouth or isotonic sodium lactate solution given intravenously. (ii) Alkalæmia is uncommon in renal failure; when it occurs it is associated with potassium deficiency. Vomiting is the usual cause of loss of potassium; excessive intake of alkali can induce alkalæmia. The clinical picture is dominated by tetany, caused indirectly by a fall in the level of ionized calcium; directly, alkalæmia is marked by stupor, headache, changes in temperament even to psychosis, and occasionally a dislike of sweet foods. The plasma bicarbonate level is raised (as also in respiratory acidosis, in which, however, there is a cyanosis of central origin, and no tetany). The kidney, even when severely damaged, can correct alkalæmia provided the volume of extracellular fluid is normal and there is no deficiency of potassium; treatment therefore involves correcting any extracellular underhydration by giving sodium chloride solutions and then supplying potassium if it is deficient. (iii) Hyperpotassæmia occurs when the potassium intake exceeds the kidney's capacity to excrete it, as when potassium citrate is given as a diuretic in acute nephritis or with sulphonamides. Anuric patients receiving too few calories in their diet, or suffering from an infection, have a high rate of catabolism; potassium migrates from the cells into the extracellular fluid. Hyperpotassæmia almost always occurs in underhydrated patients. Rarely, a generalized flaccid hyporeflexic paralysis occurs, but usually there are no symptoms or signs and the patient just dies suddenly of cardiac arrest. The serum potassium level is low; the electrocardiogram shows a characteristic pattern. When the mechanism is that of migration of potassium from the cells into the extracellular fluid, treatment should be by giving the patient large amounts of glucose; this moves into the cells, taking with it potassium to form a glycogen-potassium complex. When large areas of damaged muscle are releasing potassium at a high rate, this potassium can best be removed by dialysis through an artificial kidney; when a slower rate of removal will suffice, the patient may be fed an ion-exchange resin in the sodium cycle. The toxic effect of hyperpotassæmia can also be reduced by raising either the calcium or the sodium level; a mixture containing glucose, calcium and sodium has a fairly rapid effect. (iv) Hypopotassæmia occurs in the early phase of tubular necrosis and occasionally in chronic renal disease when there is a defect in tubular reabsorption of potassium. Much potassium is lost during vomiting or diarrhœa. Clinically, there is usually some clouding of consciousness, and generalized areflexic paralysis develops. Serum potassium is reduced in amount, and the electrocardiogram is characteristic. It is safest to administer potassium by mouth; the chloride is best. Intravenously, it can be given very slowly (one gramme in 500 millilitres over one hour) if absolutely necessary. It is a safe rule that potassium should not be given to any patient whose urine flow is less than one millilitre per minute. (v) Hypercalcæmia is uncommon in renal failure—when it occurs it is the cause rather than an effect, as in vitamin *D* intoxication, sarcoidosis, hyperparathyroidism or myelomatosis. (vi) Hypocalcæmia in renal failure is linked with plasma inorganic phosphate content and pH. When the glomerular filtration rate is reduced, the phosphate level rises (parallel with the azotæmia), and the serum calcium level falls. If acidæmia is present, a low absolute serum calcium level is compensated for by the greater amount that is ionized; correction of the acidæmia without reducing the phosphate level may then precipitate tetany. When the level of calcium ions is low, there may be twitching or generalized epileptiform convulsions. (vii) Magnesium deficiency occurs in the early diuretic phase of acute tubular necrosis; no special picture is presented. (viii) Excessive magnesium is present when the excretion is impaired and magnesium sulphate is given as an aperient; the clinical effect is the same as when a mild sedative has been given.

Disturbances of water balance are less understood, but much more important. (i) Cellular overhydration is common, especially in anuria, but also in chronic renal failure and certain types of circulatory renal insufficiency (so-called "extra-renal uræmia"—an insufficiently specific term). It is determined by a discrepancy between intake and output of water due to disturbances of osmotic pressure depending on imbalance of electrolytes. Increased fluid intake or the rate of production of water from metabolism of fat may produce expansion of tissue fluids and lowering of their electrolyte levels, with osmotic diffusion of excess water into the cells. This is common in anuria, and excessive water-drinking in chronic renal failure produces the same effect. In the latter case, there is first diuresis, but then, possibly because of swelling of the renal cells, oliguria supervenes; this may be fatal. The same effect can be produced if the sodium intake is low, as when a patient is on a salt-free diet or if the sodium loss is high either because of diarrhœa, vomiting or sweating, or through the kidney in acute or chronic renal failure. Clinically, cellular overhydration is marked by anorexia, nausea, vomiting, lassitude, stupor and confusion, changes of mood, coma, epileptiform convulsions and muscle cramps. The serum sodium level is low, the mean corpuscular volume is high. (ii) Extracellular overhydration may be due to pure expansion of tissue fluid without increase in volume of the plasma, as in nephrosis and other protein deficiency states, or to expansion of tissue fluid with increase in plasma volume, as occurs when excess water and salt are given—for example, when sodium sulphate or chloride solution is given intravenously to patients with anuria. The clinical

[1] *Lancet*, April 9 and 16, 1955.

condition resembles that of congestive heart failure (congestive heart failure, *per se*, or excessive administration of adrenocortical hormones, produces the same effect). (iii) Cellular underhydration usually occurs along with extracellular underhydration due to water loss in excess of intake, and the result is an increase in the specific gravity of the plasma due to concentration of the plasma proteins. When there is primary retention of sodium, however, there is osmotic movement of water from the cells into the tissue fluid; this is usually due to administering isotonic sodium solutions to dehydrated patients without also giving extra water—even small water losses through the lungs and skin can then cause imbalance, allowing the tissue fluid to become hypertonic. If the patient is conscious, he complains of thirst; later he becomes stuporose or comatose, and often he develops coarse twitchings. Particularly in children the body temperature may rise to as high as 103° F. The plasma sodium level is high. (iv) Extracellular underhydration may occur as part of a general underhydrated state when water loss exceeds intake, or else as an isolated manifestation of a deficiency in extracellular ions. The picture is familiar: sunken facies, lax skin, diminished eyeball tension and, later, hypotension and rapid pulse. There is peripheral circulatory failure, and this, as circulatory renal insufficiency, may initiate many of the other types of uræmia.

At average temperatures, patients in bed have an insensible water loss of about 800 millilitres per day; the basic intake should be this amount, except in anuria, in which catabolism of body fat produces some 200 millilitres of water per day, so that the basic intake should be only 600 millilitres.

Extracellular underhydration, because of the associated circulatory insufficiency, needs urgent correction. It is always accompanied by some degree of intracellular underhydration, but this cannot conveniently be dealt with until the extracellular fluid has been replaced, since in underhydration there is always an excess of intracellular ions in the extracellular fluid, and time for reestablishment of equilibrium must be allowed. The plasma specific gravity is the best guide—each 0·001 rise, above 1·027, represents a lack of 200 millilitres of fluid. Isotonic sodium chloride solution is given with sodium bicarbonate added to correct any acidæmia which may be (and usually is) present. Glucose solution (5%), if given alternately with the sodium solution, promotes migration of potassium ions back into the cells; it also prevents that form of cellular underhydration described above. Once the extracellular fluid has been replaced, cellular hypopotassæmia can be corrected. Maintenance of fluid volume depends on the excretory capacity of the kidneys, which can conveniently be estimated from the degree of azotæmia present. Bull's rule is, for patients with a blood urea level of 100 milligrammes per 100 millilitres or higher, to give the basic 800 millilitres with an amount equal to the previous day's excretion of urine *plus* 200 millilitres, and repeat this till the daily excretion of urine is steady. When there is sodium deficiency without underhydration, the presence of œdema demands a low sodium intake (less than one gramme of sodium chloride a day is required). Most diets given to patients with chronic renal failure are high in acid ash content, and there is a tendency to acidæmia; for non-œdematous patients, therefore, the usual salt in their food can be supplemented by three grammes of sodium bicarbonate and two grammes of sodium chloride per day.

The rate of production in the body of the substances concerned in producing the uræmias is related to the rate of catabolism. An intercurrent infection in a patient with renal failure can raise the rate of catabolism high enough to produce uræmia. Bull recommends, for acute renal failure, isolating the patient with barrier nursing and a routine penicillin cover. In the treatment of actual infections, loss of renal excretory efficiency, as indicated by the blood urea level, influences the excretion of sulphonamides and all the antibiotics except penicillin; so that maintenance doses must be decreased to match the lowered renal efficiency. The administration of testosterone to anuric patients in doses of five to ten milligrammes per day reduces catabolism. A diet of high carbohydrate and low protein content also serves to reduce catabolism.

The anæmia which accompanies renal failure adds to circulatory renal insufficiency; it does not respond to the usual hæmatinics and must be handled by means of blood transfusions, or, in anuric patients, packed red cells. If there are nausea and vomiting, not due to cellular overhydration, chlorpromazine, 25 to 50 milligrammes three times a day, often helps. Hexamethonium or rauwolfia, cautiously administered, by lowering hypertension, may help to remove strain from the renal circulation.

Professor Bull concludes with the observation that all the uræmias are not necessarily the inevitable consequence of renal failure; some types of imbalance can easily be corrected, and some are the direct result of faulty management due to ignorance of the mechanisms involved. Nowhere have we seen so convincing an exposition of the modern view of renal failure and its consequences as in this article.

NEOMYCIN IN OPHTHALMOLOGY.

IN a preliminary report on the topical use of neomycin in ocular infections, Severino P. Lopez[1] points out that selection of an antibiotic for treating an infection of uncertain bacterial origin may be based on (i) assuming the identity of the causative organism from the clinical appearance, (ii) making a smear and identifying the organism, (iii) making a culture of the organism and determining its sensitivity to various antibiotics, and (iv) trial and error. He regards all but the third as too hit-and-miss, and the third as too time-consuming and costly for ordinary needs, and states that what is needed is a versatile antibiotic which covers all organisms. (How true this last part is—and not only in the sphere of ophthalmology!) Lopez then gives a table showing that a large variety of both Gram-positive and Gram-negative organisms have no resistance to neomycin. Next he records the results of neomycin treatment of 36 patients with assorted infections of the eyes; 26 were improved, five slightly improved and five unimproved. Neomycin was successful in ten instances when penicillin, chlortetracycline or oxytetracycline had previously failed. On the other hand, the neomycin failures were subsequently recouped by the other antibiotics. In particular, one patient with tuberculosis of the conjunctiva, which had failed to respond to penicillin, chlortetracycline and "Argyrol", improved with neomycin. Lopez is "particularly impressed" by this case, which he regards as "significant"; apparently it constitutes the only source of his conviction that neomycin "may eventually replace streptomycin". Surely this sort of attitude does not help any cause. Neomycin should be useful, but, on Lopez's own showing, at the best it appears to be only another antibiotic.

RECURRING ABDOMINAL PAIN IN CHILDREN.

RECURRING abdominal pain in children is very commonly met with in general practice, and can be most puzzling at times. Discussing a careful and thorough survey of this symptom in 243 children, E. E. Brown[2] points out that in 75 the final decision was "colic of unknown cause" and in 23 the pain was labelled "psychogenic"; definitive diagnoses were reached for the remainder. He states that the possibility of chronic sinusitis as a cause of the pain was completely overlooked in this survey, and offers the following observations: (i) Pain of this type occurs most commonly in the autumn, frequently in winter or spring, and rarely in summer. (ii) Commonly associated with the pain are nausea, particularly at breakfast time, vomiting, head cold, cough, low-grade fever, *fœtor oris*, photophobia, headache and pain in the legs, and these,

[1] *Antibiotics & Chemother.*, December, 1954.
[2] *Arch. Pediat.*, January, 1955.

taken together, are symptomatic of chronic sinusitis. (iii) Sinusitis presents in children with circles and puffiness under the eyes, puffiness at the sides of the nose, nasal obstruction, mouth breathing, tenderness over the sinuses, and cervical adenitis despite previous tonsillectomy. This symptom complex is frequently accompanied by abdominal pain, often amounting to short spasms of sudden, acute colic. (iv) Non-specific mesenteric lymphadenitis, much appendicitis, and "primary" peritonitis are associated with upper respiratory streptococcal infections. (v) Chronic sinusitis exists in all rheumatic children, and abdominal pain is one of several pre-rheumatic symptoms. (vi) Henoch's purpura causes abdominal pain, and is often associated with hæmolytic streptococci in the naso-pharynx.

Brown suggests that whenever the cause of recurring abdominal pain in children seems obscure, a focus for the dissemination of streptococcal toxins should be sought in the sinuses, and claims that a thrice-daily routine with nasal drops or sprays, hot towels and steam inhalations, and possibly penicillin injections for acute exacerbations, will banish the pain and its associated symptoms. "Focal sepsis" had a tremendous vogue for a time, and then the pendulum swung far over. The term became anathema. Now there are many signs that it is coming into use again. Articles like this one of Brown's are appearing, some of them reading as if the author was making an entirely new and fresh discovery; Brown, for instance, gives no hint that thirty years ago every sinus, along with tonsils, teeth and gall-bladder, was subject to the deepest suspicion and scrutiny, and streptococci were blamed for all the things he mentions, and a thousand more. Since the theory, within reasonable limits, is basically sound, a revival within reasonable limits can be welcomed.

CHELATING AGENTS AND MERCURY POISONING.

A RECENT comment on chelating agents, in these columns,[1] mentioned that so far ethylenediamine tetra-acetate (EDTA) did not appear to have been used in the treatment of poisoning by mercury, thallium or arsenic. Reference was also made to the universal presence of appreciable amounts of lead in normal persons not unduly exposed to it, and to the effect of EDTA in increasing its excretion. Now R. F. Bell, J. C. Gilliland and W. S. Dunn[2] have published an interesting report, "Urinary Mercury and Lead Excretion in a Case of Mercurialism". A patient with clinical signs of mercurial poisoning was shown to be passing, in his urine, 0·23 milligramme of mercury per twenty-four hours. When he was given calcium EDTA (unfortunately the amount is stated to have been "2·5 gm. of a 3% solution", but this can only mean "as a 3% solution"), his mercury excretion fell to 0·06 milligramme per day, while his lead excretion rose from 0·04 to 0·21 milligramme. When the EDTA was discontinued, excretion reverted to the former rates. Then dimercaprol (BAL) was given, and mercury excretion rose to 0·48 milligramme per day, while the lead excretion did not change. Lead, of course, has a higher chelating priority than mercury, and not until all the available lead has been chelated can the mercury be taken up. But in addition, from the figures given it would seem that the lead chelate has an excretory priority over free mercury—this is an interesting point not brought out by other workers.

The therapeutic results are disappointing, but not necessarily discouraging. It would have been illuminating if a larger dose of EDTA had been tried (normal adults have been given five grammes daily for three weeks without ill effects), to see if all the available lead could be chelated and a surplus made available for the mercury. Moreover, the lead excretion figures (0·04 milligramme increased to 0·21 by EDTA) suggest that full use was not made of the EDTA, when they are compared with an already established normal of 0·06 milligramme increasing to 0·46. The report makes no mention of measures to alkalize the patient's urine; the maximum chelating activity of EDTA is achieved at a pH of 7·4, so that sodium bicarbonate is needed to attain the best results. Theoretically, then, giving larger doses of EDTA and making the urine strongly alkaline should be effective, and it would be a great pity if these measures could not be tried.

[1] M. J. AUSTRALIA, June 4, 1955.
[2] *Arch. Indust. Health*, March, 1955.

GOLD AND CORTISONE.

GOLD, having suffered an eclipse of popularity in the treatment of rheumatoid arthritis, achieved a partial recovery a few years ago; the availability of BAL for reducing the severity of toxic reactions may have had something to do with its return to favour. More recently there have been reports that combined treatment with gold and cortisone gave better results and offered evidence that cortisone gave some protection from gold toxicity. P. J. Bilka and M. H. Weil,[1] in an article entitled "Gold-Hormonal Therapy in Rheumatoid Arthritis", report on 50 patients who were given gold in combination with cortisone, hydrocortisone or corticotropin. Their results were no different from those that can be obtained from the use of gold alone, and they found that 22% of patients suffered toxic reactions while the combined treatment was in progress, and 24% after the hormone had been discontinued and the gold was being given alone. The incidence and nature of these toxic reactions are not notably different from those observed with gold alone. The authors conclude that the only benefit of the combined therapy is that the severity of the disease can be mitigated and controlled by the hormone during the period of building up the gold to the required level; the hormone is then discontinued, and thereafter gold therapy carries on alone, with no expectation of results any different from those normally obtained without the use of the hormone. Even though these conclusions will be disappointing to those who hoped for bigger things from the combined therapy, there is still something to be gained by exploiting this small advantage.

[1] *Ann. Int. Med.*, March, 1955.

"THAT AWFUL TUBE!"

COUNTLESS anathemas have been called down upon the head of Dr. G. A. Ryle, inventor of that useful little tube which so many ungrateful sufferers find so difficult to swallow. However, several workers have lately been exploring an ingenious indirect method of estimating gastric acidity—the opprobrium with which the ordeal of the tube is everywhere regarded is reflected in the name given to the new technique—the "tubeless method" of gastric analysis. Segal, Miller and Morton developed the method in 1950; it depends on the fact that the quinine with which an ion-exchange resin has been treated is rapidly released by the action of gastric hydrochloric acid, is partially absorbed, and a final fraction, about 1%, is excreted in the urine within two hours. The quinine is extracted from the urine and estimated by comparison with standard solutions according to its fluorescence under ultra-violet light. R. D. Lewis and A. G. Foord[2] have perfected a simplified method of extracting the quinine which puts the test within reach of any laboratory possessing an ultra-violet light comparator, and have described it in detail in "Determination of Quinine in Urine in 'Tubeless Method' of Gastric Analysis". Actually, the test, while accurate in indicating gastric achlorhydria, is less consistent in cases of hyperchlorhydria, but nevertheless it has a wide range of application and should prove a boon to many of those unfortunates who suffer from "tube dysphagia".

[2] *Am. J. Clin. Path.*, February, 1955.

Abstracts from Medical Literature.

OPHTHALMOLOGY.

Chlorpromazine for Premedication in Ophthalmic Surgery.

J. GIBSON MOORE (*Brit. J. Ophth.*, February, 1955) used chlorpromazine ("Largactil") for premedication in 58 ophthalmic operations. In all the patient's behaviour at operation was either excellent or good. The author considers that chlorpromazine produces a more relaxed patient and an uneventful post-operative period.

Meridional Lamellar Scleral Resection.

R. E. MEEK (*Am. J. Ophth.*, December, 1954) describes his technique of lamellar scleral resection in which a meridional resection is combined with a longitudinal resection. He is of the opinion that if the sclera is shortened, then it should be from side to side as well as before backward. The author has used the technique in eight cases with six successes.

"Priscol" and Retinal Artery Occlusion.

L. M. WEERAKOON (*Brit. J. Ophth.*, February, 1955) reports on the successful use of "Priscol" with central retinal artery occlusion. In the first case the occlusion had been present for several hours, in the second for eighteen hours, and in the third for seven days. In all cases improvement occurred; in the first two normal vision was recovered. The author recommends an initial retrobulbar injection of "Priscol" to be followed by oral administration of "Priscol" and nicotinic acid for at least one month.

Dicoumarol for Retinitis Pigmentosa.

L. S. LEO AND B. LIDMAN (*Am. J. Ophth.*, January, 1955) present the results of treatment of *retinitis pigmentosa* with dicoumarol. Thirty-seven patients have been treated, of whom 33 showed improvement. Intensive therapy was given in hospital for one week, and then a maintenance dose was given at home for six weeks. Those patients who improved showed improvement in visual acuity and visual fields.

The Management of Aphakia.

B. D. LEAHEY (*Am. J. Ophth.*, January, 1955) discusses the ordering of spectacles for the aphakic patient. He states that if the vision in the unoperated eye is very poor, a temporary +11·0 sphere can be ordered for the operated eye as soon as it has recovered. A fitted correction should not be ordered for six weeks, as the cylinder changes considerably in that time. Most patients will not tolerate the cataract correction and blurring of the unoperated eye unless the visual acuity in the operated eye is at least two or three Snellen lines better than in the unoperated eye. The author does not recommend bifocals as the initial correction. He describes the technique for ordering the aphakic correction and for checking the glasses after they have been made. He states that after the first six months there may be no change in an aphakic correction for six to ten years.

Visual Toxic Symptoms from Digitalis.

C. A. TURTZ (*Am. J. Ophth.*, December, 1954) reports on two patients who developed visual hallucinations following the administration of digitalis. One patient who had been receiving digitalis for five weeks complained of blurred vision and of the impression that objects were covered with snow; the central field showed a central scotoma. The second patient complained of blurred vision, flickering of light and yellow vision. Both recovered on withdrawal of the drug.

Cataract Extraction with Iris Inclusion.

E. J. WENAAS AND C. W. STERTZBACH (*Am. J. Ophth.*, January, 1955) discuss the problem of cataract extraction associated with glaucoma. They report on their experience of iris inclusion and cataract extraction performed at the same time. They operated on 25 patients who had cataract associated with raised intraocular tension. One group of patients had cataract with chronic simple glaucoma, the second group had cataract with acute rise in tension due to the intumescence of the lens, and the third group had mature or hypermature cataracts with rise in tension due to causes other than those found in the first two groups. Of the 25 cases, in only one was the tension not controlled. Four patients required miotics to control the tension, and one patient required cyclodialysis.

Acute Ophthalmoplegia.

I. ABRAHAMSON AND I. D. HOWITZ (*Am. J. Ophth.*, December, 1954) discuss the differential diagnosis of acute ophthalmoplegia. They state that the usual picture is that of a patient with a sudden onset of ptosis preceded by hemicranial or orbital pain. In addition to ptosis there is involvement of the third, fourth and sixth cranial nerves. There is loss of accommodation. The authors enumerate the intranuclear conditions which may produce ophthalmoplegia and briefly review each condition.

Two Preventible Forms of Blindness.

T. GUNDERSEN (*J.A.M.A.*, November 6, 1954) states that in measures for the prevention of blindness the accent must be placed on the two greatest causes of blindness in the United States—chronic glaucoma and *amblyopia ex anopsia*. Both of these conditions are preventible to a large degree, the problem being primarily one of detection. On the question of prevention of glaucoma, the author states that wider publicity must be given to the well established fact that 2% of all Americans after middle life have symptomless, unrecognizable glaucoma. This must be taught the physician, the medical student and the public at large. Only when this knowledge is disseminated will the use of the tonometer become more widespread. Turning to the subject of *amblyopia ex anopsia*, the author states that all children should have their visual acuity tested on or just before their third birthday. This is our only hope of decreasing the high incidence of monocular blindness as it exists today. Ophthalmologists, in their practice, in their teaching and in their professional contacts can rightly vest themselves with the responsibility of bringing about effective programmes for the early detection of these conditions at a stage when treatment can, in large measure, prevent blindness.

Prophylaxis of Ophthalmia Neonatorum.

IDA MANN (*Brit. J. Ophth.*, December, 1954) has conducted a clinical experiment to ascertain the necessity for prophylaxis of *ophthalmia neonatorum*. In one group of babies silver nitrate was instilled into each eye at birth; in the other group swabbing of the eyelids alone was carried out. In the control group 17·5% of babies developed sticky eyes, and in the treated group 12·4% developed sticky eyes. No severe infection occurred in either group. Where organisms were grown, sensitivity tests showed strong resistance to penicillin and sulphadiazine. All organisms recovered were sensitive to streptomycin. The author concludes that the use of silver nitrate is unnecessary in a modern hospital and with a population in which gonorrhœa is rare.

Corneal Grafting.

A. FRANCESCHETTI (*Am. J. Ophth.*, January, 1955) describes the types of corneal grafts in use and the indications for their selection. The perforating graft is recommended for keratoconus, deep keratitis, traumatic leukomas, familial corneal dystrophies and some cases of descemetocele. The lamellar graft may be optical or therapeutic; in the former case it is indicated for superficial opacities and aphakia, and patients with one eye. The indications for the therapeutic lamellar graft are fewer since the introduction of ACTH and cortisone, but it may be valuable for keratitis due to neurotropic virus, ulcerous keratitis, luetic interstitial keratitis, alkaline and acid burns and recurrent pterygium. Finally the lamellar graft may be used preparatory to a perforating graft. The mushroom graft is a subtotal lamellar graft with a perforating central foot. There is no firm indication for its use, but it is useful when other grafts fail, as in severe chemical burns, aphakia and severe leukoma with considerable surface irregularity. A particular indication for its use is Fuchs's corneal degeneration.

Ocular Signs and Symptoms in Verified Brain Tumour.

J. O'ROURKE AND N. SCHLEZINGER (*J.A.M.A.*, February 26, 1955) review 100 patients with cerebral tumour who presented themselves at an eye hospital and who were subsequently referred to a neurologist. Headache was the most

frequent symptom but was the chief complaint in less than half of the cases. Subjective impairment of vision was the symptom that most often caused the patient to come to an ophthalmologist. Only 17 patients complained of diplopia. Over half the group had loss of visual acuity below 6/60 in either eye. Optic atrophy was present in 58 cases and was secondary to papilloedema in seven; papilloedema was seen in 42. Thus significant abnormalities of the fundus were present in more than 80 patients at their initial examination. Visual defects were present in 69. About 80 of the tumours are included in five major groups—namely, pituitary tumour 29, meningioma 21, glioma 10, metastatic carcinoma of the nasopharynx 10, and acoustic neuroma eight.

Cyclodiathermy.

A. J. GOLDSMITH (*Tr. Ophth. Soc. U. Kingdom*, 1954) briefly describes the three types of operation around the ciliary region. The first is perforating diathermy or electrolysis, an operation which produces partial destruction of the ciliary body and so a reduction in the amount of aqueous formed. The second, cycloanæmization, has as its object the diminution of the blood supply to the ciliary region. The third is ciliary or retrociliary diathermy, the object of which is to produce vasodilatation in the anterior part of the uveal tract with coexistent increase of capillary permeability. The author favours the latter operation. He emphasizes the following points in technique: it is essential to keep at least six millimetres from the limbus, it is essential to include the whole circumference of the eye, it is unnecessary to reflect the conjunctiva, but firm pressure on the eye is necessary in order to transmit the heat to the sclera. The number of applications varies, but the author recommends 12 to 16 evenly spaced. He considers the chief indication for the operation to be secondary glaucoma and chronic simple glaucoma in the elderly.

LARYNGOLOGY.

Congenital Anomalies of the Larynx.

P. H. HOLLINGER, K. C. JOHNSON AND F. SCHILLER (*Ann. Otol., Rhin. & Laryng.*, September, 1954) discuss congenital anomalies of the larynx under the following headings: congenital laryngeal stridor, webs, atresia, subglottic stenosis, and congenital cysts and laryngoceles. Tumours of the larynx and laryngeal paralysis are not included in the subject matter of this report. The authors state that in congenital laryngeal stridor the fluttering sound is found to be produced in the majority of cases by the epiglottis. The epiglottis is curled and may even be tube-shaped. The typical stridor is produced as the curled epiglottis is drawn into the laryngeal aperture with each inspiration. Arytænoids which are long and flaccid may similarly be caused to flutter with each inspiration. Tracheotomy was needed in only one of 305 infants with congenital stridor. Other causes of noisy respiration have to be ruled out. Only the direct laryngoscopic view can confirm the diagnosis or rule out other lesions. It is extremely rare that any active therapy is indicated. Removal of bulky parts seems not only unnecessary but dangerous. Nineteen patients with congenital laryngeal webs have been observed. In 13 of these the web consisted of a membrane across the anterior portion of the glottis. Sometimes the web was thin and able readily to be split; more often a dense fusion was noted between the anterior half or more of the two cords. In three there was a membrane connecting the false cords and aryepiglottic folds, but not involving the true cords. The diagnosis can be made only from a direct view of the larynx. The surgeon should always be ready to perform a tracheotomy. Therapy has been conservative in these cases. Dilatation of the larynx has proved effective, so that more extensive intralaryngeal surgical procedures have not been necessary. Congenital atresia of the larynx is incompatible with life unless it is recognized at birth and immediate steps are taken to establish an airway. Congenital subglottic stenosis consists of a thickening of the subglottic structures and sometimes of the vocal cords themselves. The least amount of laryngeal inflammation precipitates a tracheotomy, since swelling can take place only inwardly. Thirty-four cases are reported; in 14 of these the infant patients required tracheotomy. The mild stenosis usually disappears with growth of the larynx. In more severe cases periodic dilatations of the larynx are performed. Such therapy carries some risk of subsequent complete obstruction unless tracheotomy has already been performed. Anomalies of the cricoid cartilage were responsible for subglottic stenosis in two of the cases. Congenital cysts of the larynx have been seen in five infants. The cysts appeared to originate from the laryngeal ventricle or from the region of the aryepiglottic fold. Thick mucoid material was extracted either by needle aspiration or after removal of portion of the cyst wall with cup forceps. The process has had to be repeated as hoarseness reappeared. Fifteen laryngoceles have been observed. In six cases the cyst was evacuated by uncapping the superior surface of the false cord with biopsy forceps. In the others excision was performed through an external incision along the superior border of the thyroid cartilage. Direct laryngoscopy is the most important diagnostic procedure in all cases. Instruments for tracheotomy should always be ready when a direct examination of the obstructed larynx is contemplated. Apart from tracheotomy when necessary, conservative procedures, such as dilatation and aspiration, rather than extensive surgical measures, have given satisfactory results. It is felt that surgical procedures may be approached more successfully when the infant has gained maturity.

Naso-Pharyngeal Carcinoma.

TULI DAS, G. M. TANEJA, M. R. CHADDAK AND D. B. MINOCHA (*Ann. Otol., Rhin. & Laryng.*, December, 1954) report that because of the known frequency of naso-pharyngeal cancer in Chinese, inquiry was set up to determine whether there was a racial predilection for all Orientals, or if there were any special factors operating in China to account for the heavy incidence there (18% of all cancer cases). The present inquiry extending over a period of three years took cognizance of all cancer cases in the Victoria Jubilee Hospital attached to the Medical College, Amritsar. The proportion of all cancer cases was between 1·8% and 2·3%. That from the Tata Memorial Hospital, Bombay, was 1·7%. It thus seems that there is no racial predilection of this disease for all Orientals. There are certain peculiar features which prevent early diagnosis; these are the inconspicuous and asymptomatic nature of the growth in its early stages, and the fact that the original tumour may remain quite small while metastases into the lymph glands are early and extensive. Proper examination of the naso-pharynx is often difficult, and biopsy may be inconclusive at first attempt. Most of the patients of the series of sixteen who were studied came late. Enlargement of cervical glands was already present in 90%. Various combinations of symptoms referable to eyes, ears, nose, throat, brain and cranial nerves were encountered. X-ray examination revealed destruction of the petrous apex and basiocciput and enlargement of the *foramen lacerum* in late cases. The treatment of choice is by irradiation, but the ultimate prognosis is not favourable.

Mobilization of the Stapes for Otosclerotic Deafness.

S. ROSEN AND M. BERGMAN (*Arch. Otolaryng.*, February, 1955) report that while the stapes was being palpated in a case of otosclerotic deafness there suddenly resulted a return of acute hearing. It seemed that the footplate had been accidentally mobilized. Hearing tests made shortly after the mobilization of the stapes revealed normal hearing, and this has been maintained. A technique has been developed for the deliberate mobilization of the fixed footplate of the stapes. Exposure of the stapes is made through an ear speculum in the external auditory canal. Under local anæsthesia the lower half of the drum membrane is lifted up out of its sulcus and folded up on itself, so that the contents of the tympanic cavity are exposed. With a specially designed finely pointed curved probe mobility of the stapes is tested by gently moving the long process of the incus. When the stapes is rigidly fixed, pressure against its neck may suddenly loosen the footplate with immediate improvement in the hearing. At its neck the stapes withstands the greatest pressure without fracture of the crura. The line of force should be in the line of the crura. After mobilization, the intact tympanic membrane and skin of the canal are put back into place. Healing, under antibiotic cover, is usually complete in about a week. In a series of 14 cases reported, in which the hearing was improved after stapes mobilization, the improvement had been maintained for periods up to twenty-six months. If hearing does not improve fenestration can still be performed without penalty from the attempt at stapes mobilization.

British Medical Association News.

ANNUAL MEETING.

THE annual meeting of the Tasmanian Branch of the British Medical Association was held at the Royal Society's rooms, Hobart, on March 12, 1955, DR. J. B. G. MUIR in the chair.

MINUTES.

The minutes of the last annual meeting were read and signed as correct.

ANNUAL REPORT OF THE COUNCIL.

The annual report of the Council which had been circulated amongst members was taken as read on the motion of Dr. R. Wall, seconded by Dr. J. B. Hamilton. After discussion, the report was adopted on the motion of the President, seconded by Dr. P. Braithwaite. The report is as follows.

Membership.

The present membership of the Branch is 214, including five complimentary members. This compares with the membership of 222 at the last annual meeting, indicating a loss of eight members. During the year 15 new members were elected and 10 transferred from other States. The losses were 33, made up of 29 transfers to other States, two deceased and two resigned.

Obituary.

During the year the following deaths occurred, which we record with regret and to whose families the Branch extends its sympathy. Dr. D. H. E. Lines, a former President of the Branch and a life member of the Association, and Dr. Owen Rofe.

Meetings.

The annual meeting of the Branch was held in the Royal Society room in Hobart on February 13, 1954. At the meeting the members of Council were elected and the annual report received. Amongst other business the Branch approved the new Branch rules, which had been circularized, but the date of their superseding the old rules was left to a time to be notified later, following approval of the new rules by the Council of the British Medical Association in London.

No other general meetings of the Branch were held during the year, all general business being conducted through the subdivisions as indicated in their attached reports. It will be noted that both reports indicate that considerable clinical as well as business meetings have been held at each end of the island.

Council.

Thirteen meetings of the Branch Council were held during the year. There were no special meetings. Record of attendance was as follows:

Dr. J. B. G. Muir (President and Federal Council representative)	13
Dr. Thomas Giblin (Vice-President)	7
Dr. B. Hiller (Treasurer)	10
Dr. L. N. Gollan (Federal Council representative)	10
Dr. W. K. McIntyre (President-Elect)	10
Dr. Franklin R. Fay (Honorary Medical Secretary)	13
Dr. H. Gatenby (Honorary Secretary, Northern Division)	6
Dr. K. Melville Kelly (Honorary Secretary, Southern Division)	9
Dr. P. Braithwaite (Councillor)	10
Dr. K. J. Friend (Councillor)	9
Dr. M. W. Fletcher (Councillor)	10
[1] Dr. A. Pryde (President)	2
[1] Dr. D. Waterworth (Councillor)	2
[1] Dr. C. H. Clarke (Councillor)	2
[1] Dr. A. O. Green (Councillor)	1
[1] Dr. R. A. Godfrey-Smith (Honorary Secretary, Northern Subdivision)	1

[1] Members of last year's Branch Council, which held two meetings in the period under review.

Representation.

The Branch has been represented in the past year on the Federal Council by Dr. J. B. G. Muir and Dr. L. N. Gollan. The Council records its appreciation of the time spent by these representatives who have made several interstate trips during the year to present our members' views at meetings of the Federal Council.

Dr. Muir and Dr. Gollan have been reelected by the Branch Council as federal representatives for the coming year.

Representatives of the Branch on other bodies during the period under review were: Australasian Medical Publishing Company, Limited, Dr. W. L. Crowther; Road Safety Council of Tasmania, Dr. F. Phillips; Federal War Relief Fund, Dr. Godfrey-Smith, Dr. Thomas Giblin, Dr. Franklin R. Fay; Medical Officers' Relief Fund (Federal), Dr. B. Hiller, Dr. R. Whishaw, Dr. Frank W. Fay; Tasmanian Physiotherapy Board, Dr. A. McL. Millar; Tasmanian Post-Graduate Committee in Medicine, Dr. J. B. G. Muir; Tasmanian Health Education Council, Dr. G. Robbie; Committee of Inquiry under *National Health Act*, Dr. T. Giblin, Dr. A. Young, Dr. L. N. Gollan, Dr. R. Whishaw.

Ethics Committee.

The following members comprised the Ethics Committee for 1954: Dr. J. B. G. Muir, Dr. T. Giblin, Dr. W. K. McIntyre, Dr. F. R. Fay, Dr. L. N. Gollan, Dr. K. Friend, Dr. M. W. Fletcher.

No meetings were necessary during the year.

Newsletter Committee.

Dr. K. M. Kelly and Dr. K. J. Friend edited the newsletter over the last twelve months, during which period nine newsletters were published. The "unofficial" newsletter introduced in 1953 was abandoned and a return made to an official publication. The editors are to be congratulated on improving the news coverage and in making the newsletter of much greater interest to members.

Publicity Committee.

Dr. Muir, Dr. T. Giblin, Dr. F. R. Fay, Dr. L. N. Gollan and Dr. H. Gatenby were the members of this committee during 1954. Publicity was given during the year to the Association's views on the subject of intermediate beds in public hospitals, the anomaly of non-payment of visiting specialists at public hospitals with no means test, and the employment of specialists on the north-west coast. These Press statements were necessary to correct public misstatements made by various individuals, including the State Health Minister.

Workers' Compensation Committee.

This committee, comprising Dr. Braithwaite, Dr. F. R. Fay, Dr. Friend and Dr. A. O. Green, have had a very frustrating time trying to induce the underwriters to meet them to discuss consultants' fees, ophthalmologists' fees, and several other matters. A direct approach to the Chief Secretary was abortive as he would not act until the underwriters had met the committee. The underwriters have at last consented to meet our representatives early in 1955.

One of the main causes of friction in the operation of the *Workers' Compensation Act* in this State is that frequently the doctor is not informed that the case is covered by this Act until after he has rendered his account. The Council intends to seek legal opinion on this and other aspects of the Act.

Medical Fees Committee.

Members of this committee were Dr. Gollan, Dr. Fletcher, Dr. Gatenby, Dr. Kelly, Dr. Muir, Dr. T. Butler and Dr. F. R. Fay. Although it was not deemed necessary by the Council to call this committee together during the year, there were several instances where patients expressed discontent with their account. Inquiry revealed that in each case the patient was out of touch with the usual present-day fees of specialists and the charges for special investigations, so in each case the Council informed the patient that they were not victims of overcharging.

Rules Committee.

Dr. Braithwaite, Dr. F. R. Fay and Dr. L. N. Gollan were elected to this committee. No meetings were held as it was not until late in the year that official approval of the new rules was forthcoming from London. The Council of the Association, in approving the rules, made a suggestion

about the arrangement of the part dealing with order of business at meetings and rules for debate. These suggested alterations have been made, members have been notified of them, and members' approval will be sought at the annual meeting. The new rules came into force, superseding the old rules, on October 6, 1954.

It is hoped to have the new rules published in booklet form during 1955. This will doubtless be an expensive item.

Hospital Policy.

During the year your Branch Council made strenuous efforts to have intermediate beds introduced gradually into public hospitals in Tasmania. In this action it had the support of the Health Department. The final approach was to the Premier, who ultimately wrote to the Council stating that "intermediate beds are against the present policy of his government". It would seem that for the present we are up against a "brick wall".

Similarly no progress has been made in obtaining payment for the visiting staffs in the State public hospitals which have no means test at all. The answer is as it was in the last annual report, namely, the principle is agreed with but the money available is used on more spectacular things.

Because of the absence of any facilities for private or intermediate hospitalization on the north-west coast, it was necessary earlier in the year to ask THE MEDICAL JOURNAL OF AUSTRALIA to insert a notice to the effect that members applying for part-time specialist appointments with the right of private practice in this area should communicate with the Secretary so that they were informed of the hospital situation there.

There was further dispute on the north-west coast in 1954 between the Minister for Health and local practitioners on the subject of fees to be charged for ante-natal and post-natal treatment of patients whose confinement in hospital was paid for by the Government. After much correspondence, and a visit by Dr. McIntyre to a meeting of practitioners concerned, the Minister was informed that the north-west coast doctors had resolved that there should be a fee of £4 4s. per hospital confinement and that doctors should charge their own fees for ante-natal and post-natal treatment.

Twice during the year Council representatives met the Director of Medical Services, Dr. Edis, at the Minister's request, to try to work out a common basis for the remuneration of part-time medical officers in country hospitals, as at present there is no standardization. The representatives suggested that salary should be based on the work done, the qualifications held, and the situation of the hospital. When it came to a discussion of actual figures, the reresentatives felt that their suggestions were regarded as rather expensive. However, when the Health Department has worked out a method of implementation they are to re-submit it to the Association for consideration.

Amendments to Medical Act.

During the year the Minister of Health proposed amending the *Medical Act* to give the Medical Council more disciplinary power, and he asked the Branch Council to express views on his suggestions. This action by the Minister was appreciated. After legal advice the Branch Council submitted its opinion to the Minister that the Medical Council should have power to deal with cases of misconduct, but in cases of a major nature such as infamous conduct, the Medical Council should decide the guilt or otherwise and then a supreme court judge should decide the penalty, which might be deregistration, as is done in South Australia.

Amendments to the Dental Act.

Representatives of the British Medical Association were asked to give evidence before the Select Committee of the House of Assembly inquiring *inter alia* into the desirability of registering dental mechanics to make and fit dentures without supervision by a qualified dentist. Dr. Muir, Dr. Hiller and Dr. F. R. Fay gave opinion, which was not in favour of the proposed amendment.

General Practitioner Group.

This special group, which was formed last year, commenced activities this year, and the group's annual report is attached.

General.

The first item of importance following the annual meeting on February 13, 1954, was the annual dinner held the same evening at Wrest Point. Dr. Mervyn Archdall was our guest, and 48 members attended. It was a very pleasant and successful evening and those who do not attend these dinners do not realize what they are missing.

The National Health Scheme appears to have settled down and is working satisfactorily in Tasmania with very little abuse. There have been the usual flow of suggested amendments during the year, mostly from other States, which have been submitted to your Council for its opinion. As members are aware, the Pensioner Medical Service has been the main subject of controversy, in particular the small difference in fee between surgery and domiciliary visits, and the increase in categories of pensioners. Your Council has given much of its time to these matters and has sought members' opinions through the sub-divisional meetings.

Representatives of the Council met representatives of medical insurance organizations early in the year and a discussion on mutual problems took place. Dr. Braithwaite, Dr. Kelly and Dr. F. R. Fay stressed the need to make it more difficult for patients to have their benefit paid before they have settled their account, as the balance often becomes a bad debt. The insurance representatives' main problem appeared to be knowing who was a specialist. In this regard it is worth noting that the Federal Council defined a specialist later in the year, following consultation with the various Colleges and the Branches.

In conclusion, as indicated by this report, it can be said that although there have been no dramatic episodes during the year, there has been much time and effort put in by members of your Council to ensure the smooth running of the Branch during 1954.

(Signed) J. B. G. MUIR,
President.

REPORTS OF DIVISIONS.

The reports of the subdivisions to the Branch which had been circulated among members were taken as read and received on the motion of Dr. F. R. Fay, seconded by Dr. W. E. L. H. Crowther. The reports are as follows.

Southern Subdivision Annual Report for Year 1954.

Office-Bearers and Membership.

The following members held office in 1954: Chairman, Mr. A. L. Stephenson; Vice-Chairman, Dr. A. W. Young; Honorary Treasurer, Dr. Jean M. Gunson; Honorary Secretary, Dr. K. M. Kelly; Committee, Dr. R. J. Hudson, Dr. A. Corney, Dr. K. S. Millingen.

There were approximately 120 members throughout the year.

Meetings.

Nine general meetings were held, in addition to the annual meeting. Three special meetings were held. The Executive Committee met nine times.

Lectures and Demonstrations.

Lectures and demonstrations were as follows:

"Self Examination of the Breast", "Carcinoma of the Colon" (film talks) (Mr. J. B. G. Muir), "Menorrhagia in General Practice" (Dr. C. Clarke), "The Treatment of Facio-Maxillary Injuries" (Dr. Ward), "The Symptoms and Management of Cases of Impending Coronary Occlusion" (Dr. T. Butler), "Impressions of United States of America with Some Remarks on the Use of the Papanicolaou Test" (Dr. C. Duncan), "What Has Physics to Offer?" (Dr. Martin), "The Work of the St. John Ambulance" (Dr. T. Goddard), "The Early Diagnosis and Treatment of Cancer" (Professor R. McWhirter), "Common Complaints of the Anus" (Mr. A. O. Green), "Abdominal Pain in Childhood" (Dr. N. Newman), "Cardiac Arrhythmias" (Dr. P. L. Dorney), "Results of Goitre Survey in Tasmania" (Dr. F. Clements).

General Business Matters.

1. *Week-End Roster.*—This has continued to function in a generally satisfactory manner throughout the year. At times there has been difficulty through illness or default of a member rostered for duty, but these occasions have been less frequent this year, and in general cooperation of members participating has been good.

2. *Telephone Attendance Scheme.*—This has also continued to give satisfactory service. In order to give the attendant a more equitable reward for her services, it was resolved at a general meeting to make a service charge for each call received, so that those who use the service more pay according to service received.

3. *B.C.G.*—Members had noticed that in some cases severe reactions to B.C.G. vaccination had been noted in young infants. This was brought to the notice of the Health Department, with the suggestion that routine vaccination should be suspended.

4. *Medico-Legal.*—As a result of moves by members, a medico-legal society has been formed, and an inaugural dinner was held which was very successful. One general meeting of the Society was held, which was well attended, and it is felt that a closer understanding of the problems of the two professions in their work together will ensue.

5. *Library for Southern Tasmania.*—At the request of the Superintendent of the Royal Hobart Hospital, a committee was formed to consider the establishment of a medical library for southern Tasmania. The committee has met once, and approval of the principle of paying a levy has been given at a general meeting. Negotiations are still in progress.

6. *Medico-Political.*—Matters discussed included Pensioner Medical Service, *National Health Act*.

Executive Committee.

Eight meetings were held. Attendances were as follows: Mr. Stephenson 8, Dr. Gunson 7, Dr. Kelly 7, Dr. Young 2, Dr. Hudson 4, Dr. Corney 6, Dr. Millingen (elected after first meeting) 7.

The committee adopted a policy of holding regular meetings, with lecturettes rather than long formal lectures, on subjects of general interest, with the object of increasing attendance at meetings. Efforts were also made to interest members not in private practice. The average attendance at meetings throughout the year was twenty-eight, which your committee feels is a healthy improvement.

The committee also wishes to record the thanks of the Subdivision to C.I.G. for making their rooms available free of charge for our meetings, and for their similar provision of a telephone attendant.

(Signed) K. MELVILLE KELLY,
Honorary Secretary.

Northern Subdivision Annual Report for Year 1954.

Office-Bearers and Membership.

The following office-bearers were elected for 1954-1955: Chairman, Dr. M. W. Fletcher; Vice-Chairman, Dr. W. R. Moloney; Honorary Secretary, Dr. H. B. Gatenby; Honorary Treasurer, Dr. L. H. Wilson; Committee, Dr. L. N. Gollan, Dr. D. B. Nathan, Dr. R. A. Godfrey-Smith.

The number of members of the subdivision at the beginning of the year was 85. At the end of the year 94.

Meetings.

Twelve general meetings were held during the year, including the annual meeting and one in January, 1955. Also included in the twelve is the annual post-graduate week-end.

The average attendance at meetings was 26.

Addresses.

In conjunction with meetings, the following clinical addresses were given:

March 3: "Some Problems Associated with Goitre", Dr. Clements.

June 3: "Control of Anti-Coagulant Therapy in Private Practice", "Modern Trends in Clinical Pathology", Dr. M. Shoobridge.

July 1: "Review of 100 Cases of Arthritis Treated with 'Butazolidin'", Dr. L. N. Gollan.

October 7: "On His Experiences Abroad", Dr. L. H. Wilson.

December 2: "On Medical Hypnosis"—demonstrated by cases, Dr. H. J. C. Englisch.

Colour Films.

April 1: "Cancer of Breast", "Cancer of Rectum", "Cancer of Uterus, Cervix and Body".

September 2: "Reduction of Hæmorrhage", "Muscle Relaxants", "Antihistamines".

Cases Demonstrated.

May 6: "Scleroderma", "Carcinoma of Kidney", Dr. D. B. Nathan; "Grade 4 Carcinoma of Breast Presenting in an Unusual Manner", Dr. H. B. Gatenby.

August 7: "Perforation of Bowel in Newborn", Mr. O'Brien; "An Unusual Case of Lung Abscess", Dr. Rose; "A Series of Cases of Osteomyelitis", Mr. Ferris; "A Case of Double Uterus", Mr. Ingram.

Latrobe Meeting.

Thirty-five members attended a most successful meeting at the Devon Hospital. An excellent afternoon tea was provided by the hospital and the use of the nurses' dining room was graciously granted. In conjunction with the meeting a very enjoyable dinner was held at the Tamahere Hotel in Devonport.

Annual Post-Graduate Week-End Course and Dinner.

The twenty-eighth annual post-graduate week-end course was held at the Launceston General Hospital from Friday, November 12, to Sunday, November 14. Visiting lecturers were Dr. P. Taft and Mr. J. Haywood, both of Melbourne. Each gave lectures and clinical demonstrations:

Dr. Taft: "Ovarian and Menstrual Functions", "Insulins", "Cortisone and ACTH".

Mr. Haywood: "The Indications for Thoracotomy", "The Surgery of the Heart Valves", "Diaphragmatic 'Hernia'".

Sixty members and visitors attended the course.

The annual dinner was held at the Launceston Club. The dinner was attended by forty-seven and was a great success, being declared generally as one of the best held.

Obstetrical and Gynæcological Section.

At the annual meeting of the Obstetrical and Gynæcological Section of the Northern Subdivision of the Tasmanian Branch of the British Medical Association held on January 21, 1954, Dr. Birchall was elected chairman and Dr. Thompson secretary. Six meetings were held during the year, and at each of these a paper was presented either by a member practising obstetrics or by an outside speaker. In the latter respect we have to thank Dr. Stevens and Dr. Were.

Dr. Fisher was appointed to the board of the Q.V.H. as representative of the Q.V.H. Association.

Subcommittees and Representatives.

(a) Press Publicity Subcommittee of Branch Council.—This functioned actively during the year in close cooperation with members of the Southern Subdivision. Four statements in reply to articles in *The Examiner* were made during the year.

(b) Library Representative.—A library subcommittee was appointed at the annual general meeting of 1954. This library subcommittee was reconstituted and is under the jurisdiction of the Hospital Board. At the monthly meeting of April Dr. Wall was elected as our representative.

Dr. Wall reports that the library since last year has taken out a subscription for the *Journal of Clinical Endocrinology*, and through the courtesy of Dr. Grove, Dr. Gollan and Dr. Nathan also receives the *American Heart Journal* and *Circulation*.

It is hoped that members will please not forget to enter names of journals and books, with their signatures and date of borrowing, in the ledger provided. This is of considerable help, as is the prompt return of books *et cetera* when they are finished with.

(c) Dr. L. N. Gollan.—St. Luke's Board of Management has nothing to report.

Medico-Political.

National Health Service.—During the year a lot of time was spent in discussing our attitude towards the movement of the Federal Government in the case of the Pensioner Medical Service. This began with news of the Federal Government's intention of liberalizing the means test early in the year, and discussion is still going on. We have been informed that direction is now in the hands of a committee consisting of three members of the British Medical Association, three medical insurance organizations and three politicians. Some conclusions from this committee should be available in March or April this year.

General.

Federal Council.—The Northern Subdivision is fortunate in having Dr. Gollan as representative of the Branch on the Federal Council.

At the monthly meeting in October Dr. Gollan was able to give us first-hand news of the Federal Council's decision about many things of importance.

Hospital Business. — Payment: Two unsuccessful approaches were made through the Branch Council to the Health Department for payment of visiting staff.

Cosgrove Park: An unsuccessful attempt was made to gain access of all doctors to attend their own patients. They are unable to do so as Cosgrove Park is an integral part of the General Hospital.

Pensioner Medical Service.—We learned of the existence of the Pensioner Medical Service Committee of Inquiry which had been formed of members from the north and south.

An attempt was made to obtain reimbursement for a medical man required to attend as a witness on inquiries.

It was learned that no counsel is allowed for the defence of any doctor who might be arraigned before a committee of inquiry. The reason being that the working of this committee must remain entirely a function of the medical profession.

The considerable activity on the political side of the Pensioner Medical Service has been mentioned; this has been necessary mainly for two reasons: (i) abuse of the scheme, (ii) liberalization of means test.

Pathology Services for Private Hospitals.—Considerable cooperation has been received from Dr. Were and the Commonwealth Health Laboratory during the year. Prothrombin times have been made available for patients in private hospitals.

Repatriation Payment of Officers.—This matter dragged on over the whole year and reached Branch Council level.

BRITISH MEDICAL ASSOCIATION.

TASMANIAN BRANCH.

Income and Expenditure Account for Year Ended December 31, 1954.

	£ s. d.	£ s. d.		£ s. d.	£ s. d.
To Secretary's Salary		312 0 0	By Members Subscriptions		1,394 12 6
„ Travelling Expenses		135 0 0	„ Interest:		
„ Printing and Stationery		6 15 0	Commonwealth Trading	43 16 6	
„ Papers, Postage and Duplicating		189 2 11	Australasian Medical Publishing Company, Limited	23 3 3	
„ Capitation Fees:					66 19 9
Federal Council	233 2 0				3 12 0
London British Medical Association	397 5 6		„ Sales Car Badges		225 12 2
Australasian Medical Publishing Company, Limited	222 0 0		„ Deficit		
Northern Subdivision	42 10 0				
Southern Subdivision	68 10 0				
		963 7 6			
„ Annual Dinner	61 13 6				
Less Refunded	58 10 0				
		3 3 6			
„ Rental—Annual Meeting		1 0 0			
„ Code Address		3 3 0			
„ Audit Fee		5 5 0			
„ Medical Monograph Fund		21 1 0			
„ London House		32 2 3			
„ Wreath		1 1 0			
„ Legal Expenses		15 15 0			
„ Bank Charges		2 0 3			
		£1,690 16 5			£1,690 16 5

Headquarters Fund Account, 1954.

	£ s. d.		£ s. d.
To Balance, January 1, 1954	222 9 8	By Balance, December 31, 1954	228 1 5
„ Bank Interest	5 11 9		
	£228 1 5		£228 1 5

Balance Sheet.

	£ s. d.	£ s. d.		£ s. d.	£ s. d.
English, Scottish and Australian Bank, Limited		157 8 8	Commonwealth Treasury Bonds, £1,360		1,327 5 0
Capital Account:			War Savings Certificates		133 0 0
Balance £2,141 18 9			Furniture—Cupboards		*30 0 0*
Australasian Medical Publishing Company, Limited, Debentures £111 0 0			Australasian Medical Publishing Company, Limited, Debentures	695 0 0	
	2,252 18 9		*Outstanding in Sydney*	2 1 3	
Less Deficit for year	225 12 2				697 1 3
		2,027 6 7			
War Relief Contributions		2 11 0			
		£2,187 6 3			£2,187 6 3

(Signed) B. HILLER, Treasurer.

Audited and found correct.

ADAMS AND BENNETTO,
Chartered Accountants (Aust.).

A conference was held between two of our representatives and the Deputy Commissioner. No conclusive result has yet been reached.

Executive Committee.—The Executive Committee met on ten occasions during the year. Attendances were as follows: Dr. Fletcher 8, Dr. Moloney 9, Dr. Gatenby 10, Dr. Wilson 4, Dr. Gollan 6, Dr. Nathan 8, Dr. Godfrey-Smith 9.

Dr. Wilson was away for six months of this year, during which time the duties of Honorary Treasurer were very ably carried out by Dr. Nathan.

H. B. GATENBY,
Honorary Secretary.

GENERAL PRACTITIONER GROUP.

The first annual report of the General Practitioner Group was read and received.

General Practitioner Group, First Annual Report, November, 1954.

I have the honour to present the first annual report of the General Practitioner Group of the British Medical Association.

As you are aware, following preliminary discussions, the Group was formed at a meeting of general practitioners held in Launceston on November 22, 1953, when there were 14 practitioners present, and advice was received from 21 others to say they were in favour of the Group being formed.

At a further meeting of general practitioners held in Launceston on May 23 this year, a constitution was adopted and office-bearers elected. There are now 37 financial members.

As a result of the formation of this Group a very successful post-graduate week-end was held in Hobart on July 10 and 11, at which 27 practitioners were present. The visiting lecturers were Mr. F. Stevens, M.D., M.R.A.C.P., and Mr. H. Fisher, F.R.C.S., F.R.C.O.G., who gave outstanding lectures and demonstrations. All of those who attended commented on the excellent subject matter presented by the lecturers.

The Group wishes to thank Dr. J. Drew, Superintendent of the Royal Hobart Hospital, for his assistance and lecture, and our thanks are also due to Dr. Anderson, resident pathologist.

At a meeting of general practitioners held during this week-end, it was agreed that in future an annual post-graduate week-end should be held in Hobart, preferably about May, and that the system of general practitioners participating in lectures should be continued. It was also agreed that a social event be held on the Saturday night at the next post-graduate week-end which would include wives of members.

The finances of the Group are very healthy, the balance in the Hobart Savings Bank being £62 15s. 9d. This favourable balance is largely due to the very kind action of the visiting lecturers, Messrs. Stevens and Fisher, who refused to accept their honorarium of £7 7s. each, as they both stated that they felt it an honour to be invited to the first of our post-graduate meetings, and, furthermore, they both felt that it would be a good opportunity to build up our funds for future meetings. The thanks of this Group is again extended to these gentlemen.

(Signed) TREVOR C. JAMES.

RECEIPTS.				PAYMENTS.			
Membership Fees ..	38	17	0	Stamps	4	0	0
Post-Graduate Subscriptions	28	7	0	Petty Cash		7	0
				Exchange		1	3
				Balance at Bank ..	62	15	9
	£67	4	0		£67	4	0

FINANCIAL STATEMENT.

Dr. B. Hiller, the honorary treasurer, in moving the adoption of the financial statement for the year ended December 31, 1954, pointed out that on the present scale of subscriptions the Branch was hard put to it to balance its accounts, as costs and *per capita* contributions were rising. He also said that during the current financial year the Branch would be faced with the cost of printing the new rules. Dr. J. B. Hamilton seconded the motion for adoption and this was put to the meeting and carried. The statement is published herewith.

NOTICE OF MOTION.

Dr. J. B. Hamilton gave notice of motion that the Branch Council should give consideration to increasing the annual subscription of members, and when it had considered the matter that it should call a special meeting of the Branch.

ELECTION OF AUDITORS.

Messrs. Adams and Bennetto were re-elected auditors for the year 1955.

COMPLIMENTARY MEMBERS.

Dr. J. E. Jerums, Dr. A. A. Endelmanis and Dr. K. D. Schuley were elected as complimentary members of the Branch.

AMENDMENTS TO RULES.

Dr. F. R. Fay, the medical secretary, informed the meeting that in consequence of suggestions made by the London Office in regard to the new rules of the Branch, it had been found necessary to make certain amendments in them, and as members had been advised of these in a circular dated December 12, 1954, he formally moved that they be approved. The motion was seconded by Dr. J. B. Hamilton and carried.

ELECTION OF OFFICERS.

The President announced that the following had been elected office-bearers for the year 1955:

President: Dr. W. K. McIntyre.
President-Elect: Dr. A. O. Green.
Vice-President: Dr. A. McL. Millar.
Medical Secretary: Dr. F. R. Fay.
Honorary Treasurer: Dr. B. Hiller.
Members of Council: Dr. L. H. Wilson, Dr. R. Wall, Dr. P. Braithwaite, Dr. Lindsay Jones, Dr. K. J. Friend.

INDUCTION OF PRESIDENT.

Dr. J. B. G. Muir then introduced the President for 1955, Dr. W. K. McIntyre, and vacated the chair in his favour. Dr. McIntyre thanked the members for his election.

RETIRING PRESIDENT'S ADDRESS.

Dr. J. B. G. Muir then delivered his president's address.

Choosing as the title of his address "The Dignity of the Medical Profession", Dr. Muir said that Chambers's "Twentieth Century Dictionary" defined the word dignity as "to invest with honour", and the medical profession had been "invested with honour" by the public for generations. The respect which the profession had inspired in the public had waxed and waned from century to century, and had varied from the worshipful awe with which people regarded the divinely inspired priestly healers of the early Æsculapian temples, where cure was held to be miraculous, and failure to cure merely a punishment from the gods, to the time of Darius, where failure to reduce a bad dislocation of his ankle resulting from a hunting accident caused the king to sentence the unfortunate Egyptian doctors to impalement on stakes, from which fate they were saved only by the intercession of a skilful captive Greek physician, Democedes, who reduced the king's dislocation.

The average wealthy patrician in ancient Rome always included a Greek slave skilled in healing arts amongst his servants, and some of these achieved great reputations and wealth, from gifts heaped on them by grateful patients.

Cato the Censor had been particularly biased against Greek physicians, and his declarations and warnings against their medical arts were oddly reminiscent of the attacks against organized modern medicine read in the more violent periodicals of the popular Press today. They knew that in the days of the famous "Middle Kingdom" when the Chinese dynasties ruled most of Asia, Chinese physicians were paid by families "to keep them well" and remuneration ceased when illness occurred—a type of health insurance placing the onus, very definitely and harassingly, on the doctor! Probably the first precedent of "fee for service" had been observed in some of the Æsculapian temples where, if a healed patient was tardy in making a gift, the god's message was "now thy disease is healed—then pay the fee".

Throughout the centuries the relationship between doctor and patient had varied between one of awe, fear and dread, to one of affectionate respect and expected efficiency. This was because ancient medicine was largely based on

necromancy—the casting of horoscopes, and the brewing of terrifying and nauseating potions and elixirs—and slowly changed with the march of science and the knowledge of pathology to the exact science of healing of today.

The wide dissemination of medical progress, frequently inaccurately stated in the lay Press, had educated the public of today to demand a high standard in medicine, and a reasonable degree of efficiency was expected of the modern practitioner. Indeed his prescribed training and ultimate legal licensing sought to insure this. Each country was jealous of the standard of training required of its medical practitioners, to protect the public, who in turn were now critical of anything that appeared to them as medical inefficiency, whether it was due to negligence, to carelessness, or to ignorance, and unfortunately sometimes to extortionate fees.

Since the modern State had interested itself in health politically most public hospitals and their staffs, or a proportion thereof, were government-controlled and were financed through the tax-paying public, who now expected to get value for their money, and tended to seek legal redress when they considered that this was denied to them through carelessness or neglect.

During the last quarter-century the dignity of the doctor had been frequently assailed by the aggrieved patient or his relatives, who had sought redress at law for negligence or malpractice, when treatment had been unsuccessfully rendered, or death had resulted, and attendant circumstances gave rise to doubt in the minds of the patient's family as to the adequacy of the medical care given.

In England since 1950 the *Legal Aid and Advice Act* had encouraged many "poor persons" to seek in the law courts damages for alleged medical negligence, and as this covered particularly the class of "public hospital patient", there had been numerous legal actions for damages against the medical profession or the employing hospitals. A recent leading article in *The Times* had dealt with this. The professional freedom of the doctor was founded on his direct responsibility to the patient who sought his care, and inherent in that responsibility, and therefore in his freedom, was his liability in law for any injury he might cause the patient by negligence. Exposure to litigation for negligence was now a risk inseparable from the doctor's calling, as it was inseparable from that of the nurse, of the omnibus driver, and of all to whom the citizen trusted his bodily safety. The same law applied to all. The path of the plaintiff was seldom easy, since the onus was on him to prove negligence (which was much more than misadventure or the taking of a calculated risk), and since negligence was particularly difficult to prove in medical cases. The law had not changed, yet doctors were said to be perturbed by the increase in actions for alleged negligence in recent years. When hospitals were State-controlled institutions, it was said, the patient was more critical of his treatment and more prone to resort to litigation when he was disappointed, and certainly in England public legal aid had made him more able since 1950 to try his luck in the courts.

On critical analysis, however, it could be said that really frivolous actions did not seem to be numerous. It seemed likely that the cost of litigation in the past unduly sheltered the medical profession from the discipline of the law of negligence, and that the extension of legal aid, though it had increased the number of actions, serious or otherwise, was a necessary guarantee of justice for the humbler majority of citizens. In one major respect, however, the courts had altered (or reinterpreted) the law. They had added to the doctor's personal liability for negligence a concurrent corporate liability of the hospital authority, at least when the doctor gave regular service to that hospital. The courts had previously argued quite differently. In a classical Scottish case twenty-one years previously the Lord President (Lord Clyde) held that a hospital undertook no more than: "To provide an efficient, heated, clean, wholesome sick house, equipped with the necessary furniture and fittings for the reception of patients; to employ a competent staff and to provide the necessary medicine and food."

On that view it had been held in Scotland until quite recently that a hospital was not liable even for a nurse's negligence.

Much the same had been established in England by Hillyer's case in 1909, so that a hospital authority was liable if the cook negligently poisoned patients with food, but not liable if a nurse or a doctor negligently poisoned them with drugs. In the present year, the English Court of Appeal had transformed the law. In effect, it had ruled that, where there was negligence by any regular member of a hospital staff, full or part time, medical or non-medical, the hospital, too, was vicariously liable, because it had a duty of its own, which could not be discharged by delegation to doctors and nurses, to secure competent care for the patient. A few months earlier, on two appeals involving full-time doctors, the First Division of the Court of Session in Edinburgh had at last applied the same principle in Scottish law. It remained to be seen whether the consultant who visited a hospital intermittently or only on request would also be brought within the rule. Lord Justice Denning would bring him in, since he would exclude from the rule only doctors and others selected and employed by the patient himself privately.

Whether the doctor was technically a servant (on a contract of "service") or an agent (on a contract "for services") was irrelevant, for in neither case could the hospital authority control him in his clinical work, any more than their employers could tell captains or omnibus drivers, when at the controls, how to do their work. The hospital, like the ship-owner and the omnibus undertaking, was concurrently liable, together with its staffs, not because the members of the staff acted under orders, but because the hospital had chosen them for the work and had the power to remove them.

The different view taken in the United Kingdom courts from 1909 to 1951 was therefore seen as an aberration, now corrected. The error had been made (according both to Lord Justice Denning and to Lord Cooper in the recent Scottish cases) out of tenderness to the charitable voluntary hospitals, whose funds were limited and whose senior doctors gave unpaid services. Mr. Justice Stable had put it more pungently:

> When we had assisted voluntary hospitals, if I was brought in from the streets a dying pauper, any treatment I received (and no doubt the best that science could provide) was an act of charity. Now we have gone over to the State system, and it is a matter of right for which every citizen has paid. The hospital authorities are just as much his paid servants as anybody else.

Dr. Muir went on to say that it was indeed significant that, in both England and Scotland, the decisions absolving hospitals from responsibility had been taken in actions against voluntary hospitals, whereas all the decisions establishing that responsibility had been reached in actions against municipal or national hospital authorities. The doctrine of "concurrent liability" should help to secure very necessary improvements in the hospitals in those not infrequent cases in which the negligence of one or several individuals was bound up with a faulty organization of medical work and a failure to define responsibilities with reasonable precision. It should encourage the hospital as a corporate body to give more thought to the neglected problem of explaining to patients what was being done to them and why. It should also help the aggrieved patient by enabling him to pursue an institution without having necessarily to pin the blame on one particular person therein.

But with the State more frequently appearing as sole defendant, or joined as co-defendant with a doctor, courts—and particularly juries—might well tend to assess damages more liberally. If this tendency went far, might not the State—in other words, the lay hospital authorities—begin to impose on doctors rules encroaching on their clinical freedom and hampering medical advance? That was what doctors feared. The fear was not wholly idle. It should be dispelled if senior doctors, individually and through their medical committees, squarely faced their responsibility to maintain good standards of work throughout a hospital, and if the hospital managing body invariably insisted on being guided by its medical committee in all matters affecting clinical procedures and organization. It should be realized, however, that the conditions of work in modern hospitals could not be controlled completely by the medical staff. For example, they had to depend on the engineers, the physicists, the technicians, the laboratory staffs for the proper functioning of complicated apparatus, the control of electrical hazards, the guarantee of sterility, and the like essentials of faultless service. It was only just, therefore, that the hospital should share responsibility for mischances, not specifically due to the "doctor's personal negligence". Unfortunately, in many of the "Legal Aid" cases, the plaintiff had no funds available to pay the costs if he lost, so that having successfully defended himself, the doctor might still have to pay his own costs.

Even more important to the medical profession than these costs, heavy as they now were, was the damage done to a doctor's reputation by the publicity. Too often the Press and public took notice of the allegation by the plaintiff, but failed subsequently to note a successful defence by the

doctor. The harm that a doctor could suffer had been ably put by Lord Justice Denning in a recent judgement in which he said:

> Every surgical operation involves risks. It would be wrong, and indeed, bad law to say that simply because a misadventure or mishap occurred, thereby, the doctors and hospital are liable. Indeed, it would be disastrous to the community if it were so. It would mean that a doctor examining a patient, or a surgeon operating at a table, instead of getting on with his work, for ever would be looking over his shoulder to see if someone was "coming up with a dagger". For an action for negligence against a doctor, is for him like unto a dagger. His professional reputation is as dear to him as his body, perhaps more so, and an action for negligence can wound his reputation as severely as a dagger can his body. We should be doing a dis-service to the community if we imposed liabilities on doctors and hospitals for everything that happens to go wrong. Doctors would be led to think more of their own safety than of the good of their patients. Initiative would be stifled and confidence shaken. A proper sense of proportion requires us to have regard to the conditions in which hospitals and doctors work. We must insist on due care for the patient, but we must not condemn as negligence that which is only misadventure.

In every medical or surgical procedure, however simple or apparently trivial, there was an element of essential uncertainty which could not be eliminated by knowledge, experience, or ripe judgement. No diagnosis, however soundly based or carefully made, was infallible, and any treatment, however safe it might have proved for over 20 years and in 100,000 cases, might kill or injure the next patient on whom it was tried. It was the invidious task of the courts to decide, in the light of this, whether a particular doctor in a particular case had used his own personal knowledge, experience and skill in such a way as to reduce this uncertainty to a minimum, and in the courts' decisions, opinions should at least have as big a part as facts.

When a judge criticized those who had brought an action against a doctor, his criticism was almost invariably that they had not sufficiently understood this factor of essential uncertainty in medicine. The fault frequently lay with the hospital medical staff who did not bother to explain an illness, or the risks of an operation, to a patient or his family.

From 1947 to 1953 the results for actions for negligence against doctors defended by the solicitors for the Medical Defence Union of Great Britain had been stated in *The Times* of October 25, 1954. The plaintiffs had won one-third of the cases actually tried, and lost two-thirds of such cases. Of all cases brought, one-third had been either won by the plaintiff, or settled out of court by the Medical Defence Union, and two-thirds had been either lost or abandoned by the plaintiff.

Dr. Muir said that it had been proposed that similar legislation to provide legal aid and advice for persons of limited means seeking litigation might be introduced in Australian States. If this occurred Australian practitioners might expect proceedings similar to those which had occurred in England, and they would have to be on their guard professionally lest they found themselves defendants in claims for damages for negligence or malpractice, when "misadventure", referred to earlier, might have occurred.

Despite expert legal pleading and advice, juries were notoriously sympathetic to plaintiffs in such cases, particularly as they considered that the financial loss to a medical man and the costs of the action were insured anyway, completely overlooking the fact that his reputation was bound to suffer from the publicity.

Such cases might occur in any sphere of practice, from hospital out-patients to private clinics, and Dr. Muir quoted the following cases, taken from the annual reports of The Medical Protection Society of England, to illustrate his remarks.

Death from Wrong Injection.—A member arranged to operate on a man in a casualty department for the removal of a cyst on his neck under a local anæsthetic. A nurse prepared a trolly with the necessary equipment, including a bottle containing what the member expected to be a mixture of procaine and adrenaline. The member injected five millilitres of this solution and was in the act of injecting a further dose when the patient complained of violent headache and pain in the stomach. The member immediately stopped the injection, and on examining the label on the bottle found to his dismay that it contained a solution of adrenaline marked one in 1000. The member at once gave oxygen, passed an endotracheal tube, injected "Coramine" and performed artificial respiration, but without avail, and the patient died. At the inquest the member was represented by the Society's solicitors and the verdict was death by misadventure caused by acute cardiac dilatation following the injection of adrenaline in mistake for a local anæsthetic.

The patient's widow then sued for damages both the member and the Hospital Management Committee. In collaboration with the Hospital Management Committee the Society paid a sum of money into court, but as there were infants involved the sanction of the court had to be obtained to any settlement. The plaintiff applied for leave to accept the amount in court, but the master who dealt with the matter felt that a somewhat larger amount should be paid. A further sum was thereupon paid into court, but the plaintiff by then had changed her mind and demanded an even larger amount. It was therefore decided to contest the action on the issue of damages only, and the judge who heard the case gave judgement for an amount less than that which had been paid into court. Nevertheless this unfortunate accident proved to be very expensive.

Anæsthetic Death.—A woman doctor, newly qualified, was house officer at a provincial hospital and was on duty as casualty officer when a man, aged fifty-seven years, was brought to the casualty department suffering from burns on his face which he had sustained whilst emptying rubbish into a furnace at the local refuse destructor. Owing to grime and dirt it was impossible to see the extent of the burns, so the member and another house surgeon decided to administer gas and oxygen in order to clean and inspect the affected area. It was then discovered that there were burns in the region of the nose and forehead which could not be treated with the mask in position, so they decided to give "Pentothal" intravenously, and 0·5 gramme of this drug was given by the member whilst the patient was still semi-conscious from the nitrous oxide and unable to speak. This dose was injected in two halves, with an intermediate pause, but on completion it was observed that the patient had stopped breathing and efforts to revive him were in vain. A post-mortem examination was held which revealed that the deceased had a flabby heart, and at an inquest the verdict was accidental death.

The widow of the deceased commenced proceedings against her husband's employers, and later added the member and the Regional Hospital Board as defendants. It was contended, on behalf of the plaintiff, that the member had been negligent in that she ought not to have administered "Pentothal" after nitrous oxide, and that in any event she had not allowed sufficient time to elapse after the administration of nitrous oxide before giving "Pentothal". In due course the action went to trial and, after a hearing lasting two days, judgement was given in favour of the widow, against both the member and the Hospital Board for damages, and against the deceased's employers for a small amount in respect of pain from the burns suffered by the deceased prior to his death. In his judgement the judge stated that the member was too young and inexperienced to have been placed in the position she was, with access to this drug ("Pentothal"), and that she had failed through no fault of her own to exhibit the standard of skill which was required in this case. During the proceedings notice claiming contribution and indemnity had been served by the Hospital Board upon the member, and in dealing with this his Lordship decided that the Hospital Board were 100% responsible and declined to direct the member to contribute anything towards the damages awarded. Against this decision the Regional Hospital Board appealed, and by a majority the Court of Appeal, after a hearing lasting three days, varied the order of the trial judge to the extent that the proportion of responsibility for the damage should be 20% on the member and 80% on the Hospital Board. No order was made as to the costs of the appeal, and the Board's application for leave to appeal to the House of Lords was granted.

Failure to Administer Antitetanus Serum.—A member, who was casualty officer at a general hospital, attended a man who complained of swelling and pain in his hand since pricking himself with a sprig while working in a hot-house two days previously. Prior to attending at the hospital he had been treated by his own general practitioner. The member arranged for the patient to be examined by the consultant surgeon at the hospital and administered an anæsthetic while the latter opened and drained the whitlow, after which the patient was instructed to attend as an out-patient for injections of penicillin. The member did not see the patient again, although he did attend at the hospital daily for four days to receive the treatment ordered. He then returned to the care of his general practitioner,

but after eight days he was admitted to the hospital as an in-patient and died five days later from tetanus infection.

Proceedings were instituted by the widow of the patient against the general practitioner, the member, the consultant surgeon and the Hospital Board, claiming damages for negligence on the ground that no antitetanus serum had been administered prophylactically. The Society's solicitors delivered a defence to the action repudiating liability on behalf of the member, but the action was finally settled by the solicitors for the other defendants, all allegations of negligence against the member being withdrawn.

Dr. Muir, in comment, said that it was not uncommon for a doctor to be accused of negligence in not giving antitetanus serum to patients with trivial injuries. It was easy to be wise after the event, but obviously the decision whether to do so or not had to be taken by the individual doctor in the light of the particular circumstances of each case, and the risk of anaphylactic shock should always be considered. One such fatal case had recently been reported to the Society. In some hospitals there were rules about antitetanus serum injections which should be consulted and followed by members of the medical staff, particularly those who worked in casualty departments.

Chemical Burn.—A member's assistant had been attending a female patient for bronchitis, tonsillitis and rheumatism. After she had been away convalescent for a fortnight she returned complaining that her hair was falling out; the assistant prescribed for her debility and also gave her a prescription for *Liquor Epispasticus* intended for application to the scalp as an irritant to stimulate the growth of hair. Four days later the patient returned with a big blister on the back of her left hand and small blisters on her scalp. The blisters were treated and very quickly healed, but whilst the treatment was still proceeding the member received a letter from solicitors consulted by the patient, making a claim in respect of the alleged negligence of the assistant in prescribing this particular lotion. The Society was consulted and decided to instruct their solicitors to explore a settlement, which was soon negotiated for a small sum.

Dr. Muir commented that it was noteworthy that in this case the claim was made only against the principal who had not been concerned in the treatment which gave rise to the complaint, but was nevertheless liable in law. The assistant was, in fact, a member of a protection organization, and it is essential that principals should always insist upon such membership when engaging an assistant.

Fatal Appendicitis.—One Monday morning a member was consulted by a mother about her daughter, aged eleven years. The member was told that the child had pain in the stomach for which she wanted some medicine. The child was not present, as the mother did not want to bring her all the way to the surgery. The mother said that she had taken the child to Hospital "A" the previous evening where she was examined by a doctor who had said that there was nothing very wrong. After hearing the symptoms the member's opinion was that the child had gastritis, for which he prescribed medicine, and he told the mother to let him know if the child's condition did not improve, and if she was fit enough to bring her to the surgery the following day. The next day, at about 11.15 a.m., the member received a telephone message that the child's condition had become worse and he was asked to call but not asked to visit at once. He intimated that he would visit after his morning surgery, which he did, arriving at the house about 1.15 p.m. On examination he diagnosed acute appendicitis and advised immediate admission to hospital. He wrote a letter to Hospital "B" and handed it to the mother to give to the ambulance man for delivery to the medical officer at the hospital. He went straight home to make the necessary arrangements by telephoning Hospital "B", which agreed to admit the child and sent an ambulance. The child was operated on soon after admission, but died that night. The death was reported to the coroner, who ordered a post-mortem examination and held an inquest at which a verdict was returned that the child's death was due to peritonitis and toxæmia resulting from acute appendicitis.

Four months afterwards the father instituted proceedings against the Hospital Management Committee responsible for Hospital "A" alleging that the house surgeon was negligent in examining the child on the Sunday night and in failing to diagnose acute appendicitis or peritonitis. In the course of the proceedings the member was approached by the father's solicitors, who informed him that they would like his assistance. There was a meeting between the member and the father's solicitors, who later sent a statement to the member for his approval. As he did not like this he prepared a fresh one and sent it to them. A few months before the trial the member received a letter from the father's solicitors stating that counsel had advised that the member should be joined as a defendant and he was served with a writ and statement of claim. It was alleged that the member was negligent when he saw the child's mother on the Monday (*a*) in failing to call at once to see the child or ordering her to be brought to him; (*b*) in prescribing medicine; (*c*) in failing to consult with the doctor at Hospital "A"; (*d*) that on the Tuesday, although he was asked to call he did not visit immediately; and (*e*) that he failed to take any steps to secure the child's admission to hospital on Monday or early on the Tuesday. The action in due course went to trial and on the first day judgement was given in favour of the member, but the action was continued against the hospital. Judgement was eventually given in favour of the father against Hospital "A" and the father was directed to make a contribution towards the member's costs.

Operation on Wrong Side.—A thoracic surgeon saw a patient who had a history of long-standing bronchitis and hæmoptysis. Examination revealed that he had a caseous tuberculous nodule in the right upper lobe and he was admitted to hospital for bronchoscopy, after which the member decided to defer the question of operation and keep the patient under observation. Six months later the member advised removal of the nodule and adjacent segment of the right upper lobe and the operation was arranged for the following month. The patient's name and particulars of the operation were put on the operation list by the member's registrar as "resection". The member who checked the list did not consider this description adequate and altered the list to read "Segmental Resection L.U.L.". It should have been "R.U.L.". Unfortunately this error resulted in the patient being presented to the member for operation with his left side uppermost, and it was not until after he had made the superficial incision that he realized his error. Fortunately no entry had been made into the chest or the ribs exposed. The member immediately closed the incision and sent the patient back to the ward. After the patient had recovered from the anæsthetic the member told the patient exactly what had happened and expressed his regret. Seven days later the member operated again and removed the nodule from the right upper lobe, the patient's convalescence from this operation being uneventful. The patient subsequently consulted solicitors, who instituted proceedings against the member, claiming damages for negligence. It was impossible to defend this mistake and after negotiations a sum of money paid into court was accepted by the plaintiff, which put an end to the proceedings. Dr. Muir went on to remark that doctors had also to realize that professional misadventures occurring some years previously might "catch up with them" legally. They were protected, however, by the *Limitations Act* which required that any claim be made within three years of the injury or act of negligence. Personal injuries were defined as meaning "any disease and any impairment of a person's physical or mental condition".

This three-year period, of course, permitted an action to be brought against the estate of a deceased doctor if the cause of the action occurred within three years of the date of his death.

It was most important that medical men try to keep proper notes on patients systematically and regularly, and if possible to make them at the time of treatment—whether it was a home visit or surgery consultation. This was sometimes a difficult matter for a busy and harassed general practitioner, but such notes might constitute most important rebuttal evidence in an action for negligence. On the other hand a busy doctor's verbal recollections in the witness box of a patient's condition—seen some time previously—might sound at variance with an accurate "history on admission", made on hospital records a few hours later, and strong medical evidence might be necessary to convince a jury that pathological processes might have occurred during that time, causing deterioration in the patient's condition, and not be due to undue negligence or delay on the doctor's part.

One could not emphasize too strongly the protecting and indeed moral value of a consultation in any case in which there was the least doubt as to the diagnosis or treatment, whether it was an appropriate specialist or a fellow general practitioner. Such a consultation, particularly with a consultant acceptable to the patient or his family, quite apart from being ethically proper, constituted a great defence against any charge of negligence.

It should be emphasized also that a principal in a practice was liable for all acts and omissions of any practitioner acting as his deputy or assistant, although this in no way decreased the assistant's personal responsibility.

It was very evident that with the critical public of today the standard of medical practice had to be maintained on a high level, not only in so far as professional ability in diagnosis and treatment was concerned, but also as to personal attention, and the avoidance of undue delay in visiting and answering calls.

One was constantly hearing adverse comments on the medical profession because of inability to get a doctor at week-ends, refusal of doctors to take night calls, and "sergeant-majoring" of patients in out-patient departments, with long waits. Frequently a patient sent for admission by a general practitioner "for operation" was refused a bed, without tactful explanation to the patient, and contact with the doctor concerned; trouble was thereby invited if a diagnostic error had been made.

Political publicity to charges of exploitation under the Pensioner Medical Service and *Pharmaceutical Benefits Act* were also contributing to lessen the dignity of the profession, and invited a very critical attitude on the part of the public.

Any medical practitioner who was not insured by a defence society was indeed foolhardy, and this applied to all, from the rawest newly qualified resident to the established specialist or senior general practitioner.

Under British law the profession was assured of fair legal machinery in any action for negligence, but the mental processes of juries under the eloquence of the legal profession were indeed unpredictable, and although pecuniary loss might be prevented by insurance and an action successfully defended, a wounded reputation was a serious thing for a professional man, particularly as the memory lingered on.[1]

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

LOVE AND MARRIAGE AMONG THE NATIVES.

[From "The History of New South Wales including Botany Bay, Port Jackson, Parramatta, Sydney and All its Dependencies from the Original Discovery of the Island with the Customs and Manners of the Natives and an Account of the English Colony from its Foundation to the Present Time: by George Barrington, Superintendent of the Convicts", London, 1802.][2]

THOSE who delight in sentimental love tales will probably be disgusted with the male natives of New South Wales, for their conduct to women renders them considerably inferior to the brute creation: indeed nothing but having promised to give a faithful account of all their customs induces me to state what I now find become my duty. Strangers to the finer passions, they seek only the gratification of their brutal desires, yet like other savages they have customs peculiar to themselves on such occasions.

In obtaining a female partner the first step they take, romantic as it may seem, is to fix on some female of a tribe at enmity with their own; this done, the lover, as we must now esteem him, seeks to find his intended unprotected by her friends, when he steals on the unprotected woman. The monster then stupefies her with blows, which he inflicts with his club, on her head, back, neck, and indeed every part of her body, then snatching up one of her arms, he drags her, streaming with blood from her wounds, over stones, rocks, hills and logs, with all the violence and determination of a savage, till he reaches his tribe, when a scene takes place with the relation of which I shall neither stain my pages nor offend the reader. The woman thus violated becomes the wife of the ravisher and is admitted into her husband's tribe. The tribe of the female by the favourite plan of retaliation redress this outrage, but the female herself seems contented and seldom leaves her husband or his tribe for another.

The women are kept in the greatest subjection by the men. If a tribe is travelling and meets any of our people, the women are made to retire to a distance, from which they are not suffered to advance till ordered: and on any occasion the slightest offence given to the husband is punished with a blow of the club which never fails to cause a stream of blood and very often a fractured skull: yet this inhuman practice appears rather to strengthen the wife's attachment than weaken it and the very wounds are shown as marks of honour.

In some very few cases the wives return this usage and after such an engagement they live together the same as before. The analogy there is between savages and the lower classes of people in all countries is here too obvious to escape attention.

The men do not confine themselves to one wife, but the women revenge this by retaliation and often by murder.

[1] Dr. Muir acknowledged his indebtedness to the Annual Reports for 1952-1954 of the Medical Protection Society of London, and to the leading article, and the subsequent correspondence, in *The Times* of October 28, 1954, and later; also to the "Story of Medicine", by Victor Robinson (New York Home Library, New York, 1952), from which extracts had been freely quoted.

[2] From the original in the Mitchell Library, Sydney.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 16 and 17, of April 6 and 14, 1955.

NAVAL FORCES OF THE COMMONWEALTH.

Permanent Naval Forces of the Commonwealth (Sea-Going Forces).

Appointments.—Surgeon Lieutenant William Bearn Willder is appointed on loan from the Royal Navy, with seniority in rank of 10th April, 1948, dated 1st February, 1955. John Arthur Basil Cotsell (Surgeon Lieutenant-Commander (for Short Service)) is appointed Surgeon Lieutenant-Commander (Acting Surgeon Commander), with seniority in rank of 7th June, 1951, dated 17th March, 1955.

Emergency List.

Transfer to the Retired List.—Surgeon Lieutenant Guy Austin London is transferred to the Retired List, dated 22nd January, 1955.

Citizen Naval Forces of the Commonwealth.

Royal Australian Naval Reserve.

Appointments.—Norman Campbell Birnie and Gryffydd King Roberts are appointed Surgeon Lieutenants, dated 4th January, 1955, and 11th January, 1955, respectively.

District Naval Medical Officer.—The appointment of Surgeon Commander James Estcourt Hughes as District Naval Medical Officer, Port Adelaide, is terminated, dated 31st October, 1954.

Royal Australian Naval Reserve.

District Naval Medical Officer.—Surgeon Lieutenant-Commander Colin Graham Alderman is appointed District Naval Medical Officer, South Australia, dated 1st January, 1955.—(Ex. Min. No. 30—Approved 31st March, 1955.)

AUSTRALIAN MILITARY FORCES.

Australian Regular Army.

4/8035 Captain R. C. McKinnon is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Western Command), 17th February, 1955.—(Ex. Min. No. 65—Approved 31st March, 1955.)

Citizen Military Forces.

Eastern Command.

Royal Australian Army Medical Corps (Medical).—The provisional appointment of 6/15413 Captain W. H. Patterson is terminated, 15th October, 1954. To be Captain (provisionally), 16th October, 1954: 6/15413 William Hugh Patterson.

Southern Command.

Royal Australian Army Medical Corps (Medical).—The provisional appointment of 3/101021 Captain J. S. Penington is terminated, 8th March, 1954. To be Captain (provisionally), 9th March, 1954: 3/101021 John Stuart Penington.

Western Command.

Royal Australian Army Medical Corps (Medical).—The provisional rank of 5/44300 Captain P. D. Dreidahl is confirmed.

Tasmania Command.

Royal Australian Army Medical Corps (Medical).—6/15263 Captain (provisionally) D. E. Anderson is seconded for postgraduate studies in the United Kingdom, 8th December, 1954.

Reserve Citizen Military Forces.

Royal Australian Army Medical Corps.

Eastern Command.—To be Honorary Captain, 1st March, 1955: John Field Laycock.—(Ex. Min. No. 58—Approved 31st March, 1955.)

HONOURS AND AWARDS.

THE following award has been promulgated in the *Commonwealth of Australia Gazette*, Number 18, of April 21, 1955.

AUSTRALIAN MILITARY FORCES.

The Australian Efficiency Decoration.

Lieutenant-Colonel 4/35230 Raymond Thomas Binns, O.B.E., Royal Australian Army Medical Corps (Medical).

Public Health.

POISONS ACT, 1952, OF NEW SOUTH WALES.

THE following proclamation has been published in the *New South Wales Government Gazette*, Number 43, of April 29, 1955.

I, Sir John Northcott, Knight Commander of the Most Distinguished Order of Saint Michael and Saint George, Knight Commander of the Royal Victorian Order, Companion of the Most Honourable Order of the Bath, Lieutenant-General on the Retired List of the Australian Military Forces, Governor of the State of New South Wales and its Dependencies in the Commonwealth of Australia, with the advice of the Executive Council and in pursuance of the provisions of the Poisons Act, 1952, do, by this my Proclamation, delete the following entry at present appearing in Schedule Three (Restricted Drugs) of the Poisons List:

Dexamphetamine and its salts, except when compounded with other drugs in tablets containing less than 2 mg. per tablet;

and substitute the following entry therefor:

2-Aminopropylbenzene, its salts, its N-alkyl derivatives, their salts, except when the base is supplied for inhalation absorbed upon an inert solid material.

Signed and sealed at Sydney, this twentieth day of April, 1955.

By His Excellency's Command,

M. O'SULLIVAN.

The following proclamation has been published in the *New South Wales Government Gazette*, Number 53, of May 27, 1955.

I, Sir John Northcott, Knight Commander of the Most Distinguished Order of Saint Michael and Saint George, Knight Commander of the Royal Victorian Order, Companion of the Most Honourable Order of the Bath, Lieutenant-General on the Retired List of the Australian Military Forces, Governor of the State of New South Wales and its Dependencies in the Commonwealth of Australia, with the advice of the Executive Council, and in pursuance of the provisions of the Poisons Act, 1952, do, by this my Proclamation, delete the following entry at present appearing in Schedule Three (Restricted Drugs) of the Poisons List:

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JUNE 4, 1955.[1]

Disease.	New South Wales.	Victoria.	Queensland	South Australia.	Western Australia.	Tasmania.	Northern Territory.[2]	Australian Capital Territory.	Australia.[3]
Acute Rheumatism	16(1)	1(1)	3(2)	..	..	..	..	..	20
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	1(1)	..	..	..	..	..	1
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	..	..	..	..	..
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	1(1)	..	..	..	..	..	..	..	1
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	3(3)	4(3)	..	..	..	..	..	..	7
Diphtheria	3(1)	3(3)	4(4)	2(2)	29(22)	..	..	..	41
Dysentery (Bacillary)	..	1(1)	3(2)	..	3(3)	..	..	1	8
Encephalitis	..	1(1)	..	..	..	..	..	..	1
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	1	..	..	..	1
Infective Hepatitis	42(22)	42(29)	..	13(6)	9(3)	1	..	..	107
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	..	..	..
Leptospirosis	1	..	6(1)	..	..	..	..	..	7
Malaria	..	..	..	..	..	..	..	..	..
Meningococcal Infection	2(1)	1	1	..	..	..	..	..	4
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	1	4(3)	1	1(1)	..	..	..	..	7
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	8(8)	..	..	4(4)	..	..	..	12
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	12(8)	17(14)	17(2)	9(7)	..	..	..	..	55
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	..	..	..	..	..	..	..
Trachoma	..	..	..	..	3(2)	..	..	..	3
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	27(21)	17(14)	37(15)	6(6)	6(4)	3(1)	..	..	96
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	..	..	3(2)	..	..	..	..	..	3
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

[2] Figures not available.

[3] Figures incomplete owing to absence of returns from Northern Territory.

Amphetamine and its salts, except when the base is supplied for inhalation absorbed upon an inert solid material, or when such substances are compounded with other drugs in tablet form in a quantity of 2 mg. or less per tablet.

Signed and sealed at Sydney, this eleventh day of May, 1955.

By His Excellency's Command,

M. O'SULLIVAN.

Post-Graduate Work.

THE ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.

Medical Post-Graduate Courses of Instruction for Doctors.

THE Royal Institute of Public Health and Hygiene conducts a recognized course of instruction (for post-graduate medical men and women only) for the Certificate in Public Health examination of the Conjoint Board of the Royal College of Physicians of London and the Royal College of Surgeons of England. This leads to courses for the Diploma in Public Health and for the Diploma in Industrial Health. Students are also prepared for the Diploma in Industrial Health examination of the Society of Apothecaries of London. The next course of instruction for the Certificate in Public Health will commence on September 30, 1955. Further information, entry forms and prospectuses may be obtained from the Secretary of the Institute, 28 Portland Place, London, W.1, or from the Acting Dean, at 23 Queen Square, London, W.C.1.

Australian Medical Board Proceedings.

TASMANIA.

THE following have been registered, pursuant to the provisions of the *Medical Practitioners Act*, 1938-1953, as duly qualified medical practitioners: Younger, William Vernon, M.R.C.S. (England), L.R.C.P. (London), 1954; Jones, Robert Francis Clifford, M.B., B.S., 1952 (Univ. Sydney); Woodley, John, M.R.C.S. (England), L.R.C.P. (London), 1940, D.A. (England), 1947, M.F.A., R.A.C.S., 1953; Siegele, Colin Carl, M.B., B.S., 1951 (Univ. Melbourne); Chester, Brian Charles Michael, M.B., B.S., 1949 (Univ. Queensland).

Congresses.

INTERNATIONAL CONGRESS OF OTOLARYNGOLOGY.

THE sixth International Congress of Otolaryngology will take place in Washington, D.C., from Sunday, May 5, to Friday, May 10, 1957, under the presidency of Arthur W. Proetz, M.D. The subscription for members is $25.00 (U.S.A.), which will include all official meetings of the congress except the banquet. Ladies and other relatives accompanying members may be registered as associates at a fee of $10.00. The selected subjects for the plenary (combined) sessions to be held on Monday, Wednesday and Friday mornings will be chronic suppuration of the temporal bone, collagen disorders of the respiratory tract, and papilloma of the larynx. Outstanding internationally recognized authorities will open the discussion of each of these subjects. Two types of communications are invited: (i) contributions to the discussions of the selected subjects, limited to five minutes; (ii) original papers, limited to fifteen minutes. These should be in one of the four official languages (English, French, German, Spanish). Motion picture films will be shown continuously except during the plenary sessions. There will be both scientific and technical exhibits. An interesting programme of tours, social functions and visits to points of interest in and around Washington has been arranged for the associate members. Further information may be obtained from the General Secretary, Paul H. Holinger, M.D., 700 N. Michigan Avenue, Chicago II, Illinois, United States of America.

Medical Appointments.

The following have been appointed members of the New South Wales State Cancer Council: Dr. A. B. Lilley, a member of the Hospitals Commission of New South Wales; Professor E. Ford, nominated by the Vice-Chancellor of the University of Sydney; Dr. B. T. Edye, nominated by the New South Wales Branch of the British Medical Association to represent that Association.

Dr. R. Courtice has been appointed Quarantine Officer, Mackay, Queensland, under the *Quarantine Act*, 1908-1950.

Deaths.

THE following death has been announced:

STANLEY.—Percival Hubert Stanley, on June 8, 1955, at Willoughby, New South Wales.

Diary for the Month.

JUNE 28.—New South Wales Branch, B.M.A.: Ethics Committee.
JUNE 29.—South Australian Branch, B.M.A.: Annual Meeting.
JUNE 30.—New South Wales Branch, B.M.A.: Branch Meeting.
JULY 5.—New South Wales Branch, B.M.A.: Council Quarterly.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all contract practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

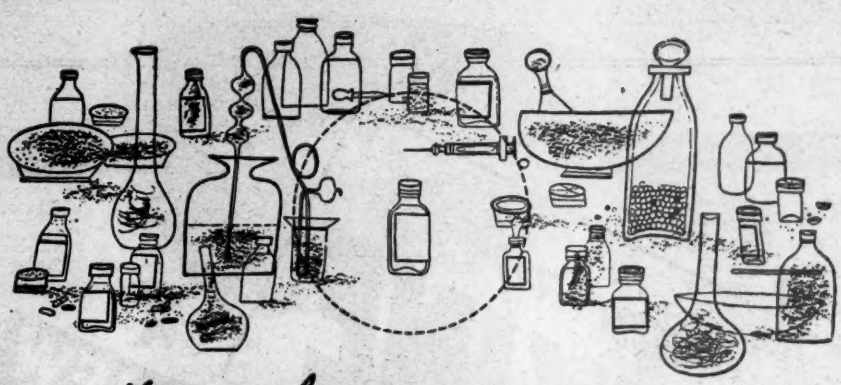
SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £5 *per annum* within Australia and the British Commonwealth of Nations, and £6 10s. *per annum* within America and foreign countries, payable in advance.

INDEX TO VOLUME I, 1955

JANUARY TO JUNE

In this index (C.C.) indicates current comment; (O) indicates an original article; (R) indicates a report of case; (rev.), a review.

INDEX TO SPECIAL PLATE SUPPLEMENTS



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Each tablet contains:

Colchicine Alkaloid	gr. 1/240
Acetylsalicylic Acid	gr. 5
Guaiacol Carbonate	gr. 2

Recommended dosage: 1-2 tablets three times daily.

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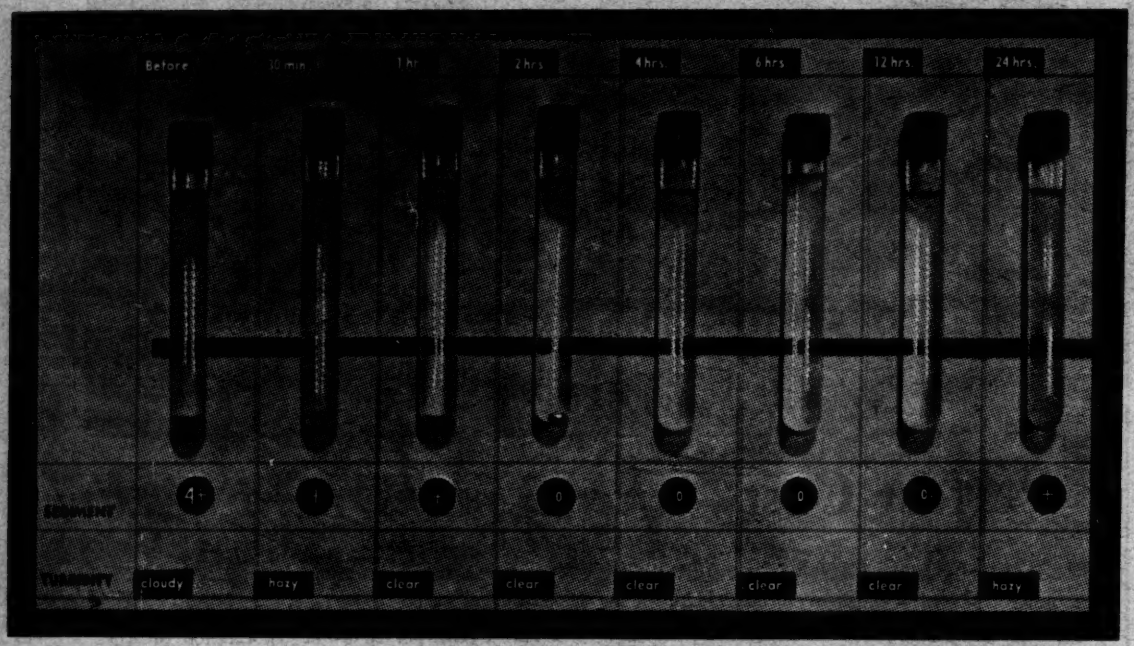

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NAPPY RINSE TABLETS

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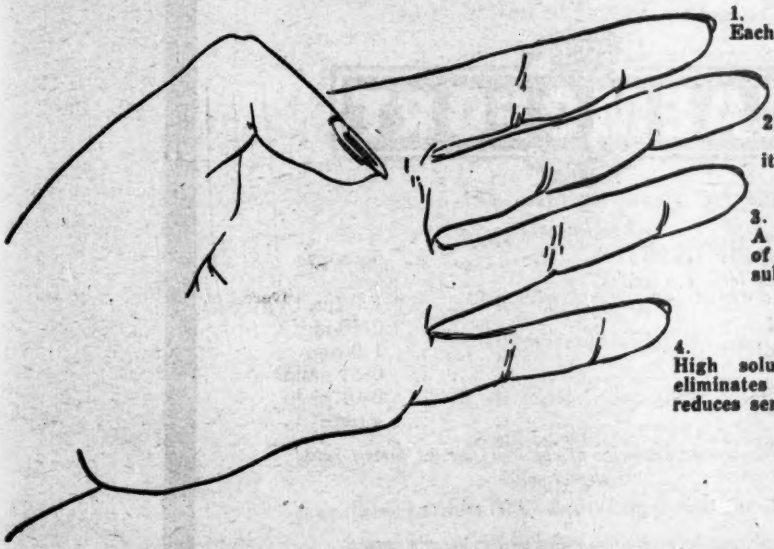

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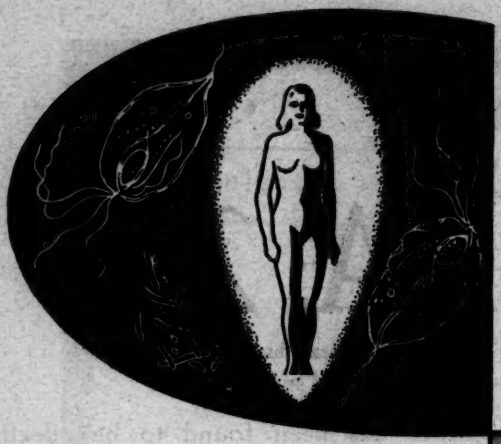

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MEDICAL PRACTICES

Sydney. One-third share available in long-established three-man suburban partnership. Takings for this financial year will be £21,000. Comparatively new home with carpets, blinds, etc., for sale at £7500. Good hospital facilities. Goodwill £5500 with terms on £3000 deposit.

N.S.W. central west practice, unopposed, long established, which took £5500 last financial year. Local 22 bed, well-equipped hospital. Mids. average 59. Population 2800. Brick, all-electric home; surgery attached. For sale at £4000 on deposit of only £500. Goodwill £2500 with terms over five years.

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L. L. Hanrahan: FF3343.

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Numerous positions available for locum tenens and assistants.

INNISFAIL HOSPITALS BOARD, QUEENSLAND.

APPLICATIONS are invited for appointment to the position of Senior Resident Medical Officer on the Board's staff at Innisfail Hospital. The medical staff comprises medical superintendent and two (2) residents. Daily average (gross) is approximately 100, including private patients. Salary ranges from £1370-£1455, plus basic wage adjustments (at present £23¼), plus district allowance of £25 (male). Salary is fixed according to experience.

Annual leave is four (4) weeks. Single officers are provided with free board and lodging in a self-contained flat. If appointee is married, the flat will be made available for his use subject to arrangement.

The right of private practice or receiving fees of any nature is not allowed.

Three (3) months' notice on either side to terminate engagement.

Application, stating marital state, age, experience and date available, and enclosing copies of testimonials, to be in the hands of the undersigned at noon on the 18th July, 1955. — SECRETARY, Innisfail Hospitals Board, Innisfail, N.Q.

FOR SALE, Half-Share in old-established two-man country surgical practice. Takings exceed £10,000. Twenty-eight-bed hospital. Remaining partner holds F.R.C.S. degree. Full particulars from S. VAN DAL & Co., Medical Agents, 156 Hay Street, Subiaco, Western Australia. 'Phone: W 3665. Telegrams: "Medicalhouse, Perth."

POST-GRADUATE STUDY BY CORRESPONDENCE FOR ALL BRITISH AND AUSTRALIAN MEDICAL EXAMS.

Diploma in Anæsthetics; Diploma in Psychological Medicine; Diploma in Ophthalmology; Diploma in Radiology; Diploma in Laryngology; Diploma in Child Health; F.R.C.S.Eng., and all Surgical Examinations; M.R.C.P.Lond., and all Medical Examinations; M.D. Thesis of all Universities; Courses for all Qualifying Examinations. Complete Guide to Medical Examinations sent free on application. Applicants should state in which qualification they are interested. Address: Secretary, Medical Correspondence College, 19 Welbeck St., London, W.1.

THE N.S.W. SOCIETY FOR CRIPPLED CHILDREN.

The Board of Directors of the N.S.W. Society for Crippled Children invites applications for the full-time position of Medical Superintendent and Chief Executive Officer at a commencing salary of £2000-£2500 per annum, according to qualifications and experience. Hospitals Commission superannuation scheme.

The position is a new one and applicants should be qualified medical practitioners who have had administrative experience and are able to handle the expanding work of the Society.

The N.S.W. Society for Crippled Children cares for 2300 children and controls three hospitals and three special schools.

Applications, stating age, qualifications, experience and other particulars, together with the names of two referees, should reach the undersigned not later than August 15, 1955.—J. H. GARSIDE, General Secretary, Box 3545, G.P.O., Sydney.

DALBY DISTRICT AND JUBILEE HOSPITALS, QLD.

MEDICAL SUPERINTENDENT.

APPLICATIONS are invited for the position of full-time Medical Superintendent to the Dalby District and Jubilee Hospitals, and are to be addressed to the Secretary, Hospitals Board, Dalby, Queensland. Salary range £1700 to £1950 per annum, plus basic wage adjustment, which is at present £23 10s. per annum. An unfurnished residence, which is fitted with an electric stove and an electric hot-water system, is provided free.

Dalby is situated 150 miles from Brisbane on the Northern Darling Downs.

BUNDABERG HOSPITALS BOARD, QUEENSLAND.

JUNIOR RESIDENT MEDICAL OFFICER.

APPLICATIONS are invited for two vacancies as Resident Medical Officers, Bundaberg Hospital, Queensland. Salary classification: first year £1040, second year £1160, plus basic wage adjustment, presently £23 10s. p.a. Free board and lodging in excellent quarters provided for single appointee. Applicants to state qualifications, experience, age, marital status and particulars of war service, if any. Successful appointee must produce evidence of registration with Queensland Medical Board on commencing duty. Applications close on 6th July, 1955, with the Secretary, Hospitals Board, Bundaberg, Qld.

R. J. JACKSON
MEDICAL AGENT

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(Continuous Service)

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Locums — Assistants

Practices for transfer.

No. 45. Sydney harbourside suburb, established general practice. Average takings exceed £5000 p.a., mids. 60, O.A.P. £600 p.a., limited G.P. surgery. Goodwill £4500, half cash, balance 5%. Modern brick residence, three bedrooms, separate entrance waiting room and surgery. Rental £7 weekly with option purchase, £6250.

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Licensed Real Estate and Business Agent

ST. VINCENT'S HOSPITAL CLINICAL SCHOOL, UNIVERSITY OF MELBOURNE.

APPLICATIONS are called for the position of the John Holt Director of Biochemical Research in the St. Vincent's Hospital School of Medical Research.

The successful applicant will be in full charge of the biochemical research work, but would merely have supervisory control over the hospital's routine biochemical department. The research laboratories have been newly built and occupy approximately 4500 square feet. Adequate funds are available for equipment. Initially the department staff will comprise the director, two assistant biochemists and two technicians. The assistant staff will be appointed on the advice of the director. Study leave will be granted after a period of five years' service. A limited amount of money for the attendance at important scientific meetings will be available. Salary is £3000 a year Australian currency; superannuation according to F.S.S.U. Reasonable travelling expenses to Melbourne will be paid for successful applicant and family. Assistance will be given in finding suitable accommodation.

Further details and plans of the laboratories may be seen at the office of the Secretary of the Association of the Universities of the British Commonwealth, Gordon Square, London, W.C.1, or at St. Vincent's Hospital.

Closing date for applications August 20. Arrangements will be made to interview selected overseas applicants in London between August 23 and 30.—E. W. R. GRACE, Chief Executive Officer and Secretary.

WILLIAM PEARCE
MEDICAL PRACTICES

Locums and Assistants available.

No. 254. Sydney. Lock-up practice in near city area. Gross takings £800 per month without surgery or midwifery. Expenses approximately £1500 p.a. Goodwill £6000. Excellent opportunity for partnership which includes a surgeon. Alternatively, a half-share of goodwill is available for a suitable partner. Premium £3000.

No. 292. Nortern Rivers, N.S.W. One-third share available in well-established group practice taking £12,000. Expenses approximately £1500. Excellent hospital facilities. Goodwill £2750. Modern home of five bedrooms containing all conveniences £4850. Goodwill and residence available at inclusive price of £7000.

No. 293. New England, N.S.W. General practice conducted from well-fitted professional rooms in main street of important and progressive town. Takings exceed £3000. Goodwill £2000. Furniture, etc., at valuation. Low deposit. Generous terms. Attractive furnished home available at £5 per week.

WILLIAM PEARCE AND CO. PTY. LTD.
LICENSED REAL ESTATE AND BUSINESS AGENTS
249 CASTLEREAGH STREET, SYDNEY
Phones: BW 8129 (2 lines) MA 8[illegible]

TOWNSVILLE GENERAL HOSPITAL, QUEENSLAND.

PÆDIATRICIAN.

APPLICATIONS are invited for the position of part-time Pædiatrician, Townsville Hospital. Appointee will be required to conduct six sessions of two hours each per week.

Salary £1160 per annum.

Annual recreation leave: four weeks.

Sick leave: one week on full pay and one week on half-pay per annum.

One month's notice in writing on either side of proposed termination of services is required.

Townsville Hospital is the base hospital for a large area of North Queensland. The population of the city of Townsville is approximately 40,000.

Accommodation available in hospital for private patients.

Applicants should state full name, age, marital status and give full details of qualifications and experience.

Certified copies (not originals) of testimonials should be forwarded.

Applications should be addressed to the Secretary, Townsville Hospitals Board, Townsville, Queensland.

THE BUSH CHURCH AID SOCIETY requires a Medical Officer who will work in its Flying Medical Service as an avenue of Christian service. Salary £1250 p.a. House, car and practice expenses provided. Apply to Organizing Secretary, Church House, St. Andrew's Cathedral, George Street, Sydney.

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